STUDIES ON CLASSROOM PROCESSES AND SCHOOL EFFECTIVENESS AT PRIMARY STAGE

A Compendium of Studies presented in the International Seminar on Classroom Processes and School Effectiveness at Primary Stage, organised by NCERT, New Delhi, 24-26 July 1996

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FOREWORD

It is encouraging that educational researchers in India have started probing into issues and problems of primary education, especially in the context of Universalisation of Elementary Education (UEE). Till recently, only about five per cent of educational research was classified under primary or elementary education. Within primary education also, only urban samples were studied. Rural and other disadvantaged sections of society remained almost untouched. Emphasis on research-based interventions to achieve the targeted enrollment, retention and quality achievement under the centrally sponsored District Primary Education Programme (DPEP) in the country, has been a major contributing factor in attracting researchers towards the primary educational sector, and rural and disadvantaged clientele in particular.

The studies reported in this publication are the few that were selected for presentation in the 1996 International Seminar of School Effectiveness and Classroom Processes at Primary Stage, organised by the National Council of Educational Research and Training, New Delhi, during July 1996. All the authors of these studies deserve appreciation for their contribution to the cause of Education for All.

The present publication has a special feature of the studies of the NCERT experiment, undertaken in 1995 by the primary teachers of Demonstration Schools of Regional Institutes of Education to try out competency-based teaching-learning strategies to ensure that every student achieves a desired level of competence. This is a step in the direction of teacher's professional empowerment. The action research studies undertaken by the primary teachers and discussed in the seminar were very much appreciated.

My colleague Prof. Kuldip Kumar, Ex-Head, Department of Educational Research and Policy Perspectives, and his dedicated team processed the studies and brought them in the present shape. Their untiring efforts to disseminate research findings to fellow researchers in general and practitioners in particular, through this publication, are indeed commendable. It is hoped that the present publication will benefit researchers and practitioners alike.

A.K. SHARMA
Director
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Research and Training

July 1997

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Recent Studies on Classroom Processes at Primary Stage

Selected Readings on International Experience

Unfinished Journey: Pedagogy and Discourse in School Effectiveness Research

Robin Alexander

CLASSROOM PROCESSES IN SCHOOL EFFECTIVENESS RESEARCH

The title of this year's seminar makes clear its aspirations: to place the classroom at the heart of the debate on school effectiveness, and, in the context of the Government of India's District Primary Education Programme, to find ways of translating this concern into strategies for improving the quality and efficiency of teaching.

The 1995 seminar ranged comprehensively over the field (NCERT 1995). International literature reviews demonstrated the strengths of existing research in respect of its analysis of input-output relationships and its identification of effectiveness indicators at the levels of the *system*, the *school*, the *classroom* and the *pupil*. Alongside these reviews, a series of studies from different parts of India investigated the impact on pupils' learning of a wide range of non-school factors, examined various options for assessing learning outcomes, and described and evaluated a number of system-level and school-level interventions.

By the end of the seminar, however, two anxieties about the school effectiveness enterprise, both in general terms and as applied to DPEP, had begun to crystallise. First, it was recognised that though classroom processes are critical to pupil performance, they remain relatively under-explored in school effectiveness research. Second, it was acknowledged that until ways are found of engaging with these classsroom processes, the relevance of school effectiveness research to the central educational acts of teaching and learning will remain at best marginal, whatever it may provide by way of insight into the relationship between inputs and outputs.

This may seem an excessively harsh judgement. After all, in Creemers' model of school effectiveness, which was presented at the 1995 seminar, there are nearly as many classroom-level factors listed as those for context, school and student levels combined:

Classroom: curriculum

- explicitness and ordering of goals and content
- structure and clarity of content
- advance organisers
- feedback
- corrective instruction

Classroom: grouping procedures

- mastery learning
- ability grouping
- cooperative learning, dependent on:
    - differentiated material
    - evaluation
    - feedback
    - corrective instruction

Classroom: teacher behaviour

- management/orderly and quiet atmosphere
- homework
- high expectations
- clear goal setting:
    - restricted goals
    - basic skills emphasis
    - cognitive learning and transfer emphasis
    - structured content
    - ordering of goals and content
    - advance organisers
    - prior knowledge
- clarity of presentation
- questioning
- immediate exercise
- evaluation
- feedback
- corrective instruction

Pupil

- time for learning
- opportunity to learn
- time on task
- opportunities used
- motivation
- aptitudes
- social background

Creemers (1995), 127

Indeed, it was its focus on specific classroom factors which, I suspect, resulted in part of Creemers' framework being used to structure the call for papers for the 1996 seminar, issued by NCERT in January

However, in terms of the balance of attention to date, we must acknowledge that most of the factors listed here remain theoretical options rather than empirical achievements. In other words, it is one thing to extrapolate from the literature on teaching and learning items like those listed, and locate them within a model of school effectiveness. It is quite another matter to devise ways of translating such items into a unitary research design in which the items can be accessed, measured and corrected on the same basis as the input and outcome measures which are the more familiar focus of such research. As yet, school effectiveness research is a long way from incorporating into its methodology in a convincing way even a minority of the process factors which Bert Creemers, very properly, has identified.

This brings us to the hub of the problem. Is the quest for a unitary school effectiveness research design, which will enable us to manipulate a wide range of process factors with the same degree of confidence as we manipulate output measures, a realistic one?

My own belief is that it is not, and I offer two justifications for this assertion, which will be developed in this paper. First, the quantitative paradigm adopted in effectiveness research, though ideal for accessing some kinds of educational phenomena (for example, student entry levels and learning outcomes in reading or mathematical, or process variables like teachers' and pupils' use of time), is far less amenable to the more elusive and complex elements of classroom life (for example, teacher-pupil relationships and the quality of teacher-pupil discourse, both of which are acknowledged to have a considerable impact on learning outcomes). Second, to persist with the attempt to render such elements into measurable factors is to ignore the insights available on classroom life from other research traditions, specifically those of a qualitative and ethnographic kind.

There is also the problem of researcher's myopia, an ever-present danger for all of us. Thus, for example, the most recent in the influential OECD series *Education at a Glance* (OECD 1995a) reduced school process indicators to just two: "instructional time" and "grouping within classes". Presumably, nobody within OECD actually believed either that teaching could be reduced to these two elements, or even that they were the most important, yet there they are—celebrated for no reason other than that they are readily measurable, and by their elevation not merely *indicating* quality in teaching but *defining* it.

Or, to take another OECD example, by means of the following formula one study has ostensibly resolved at a stroke the challenge of how to measure, in terms of hours per year, that most popular of effectiveness indicators, time on task:

$$[illegible]$$

(OECD 1990: 27)

Even with knowledge of what the letters in this formula signify, one has to recognise that its apparent mathematical precision exacerbates rather than resolves a basic flaw, namely that when one observes children in order to judge whether they are "on" or "off" task, it is possible to be deceived, since having their eyes glued to a book is no guarantee that they are actually engaging cognitively with the task in question. In any case, even if they are, the time thus spent is never constant or absolute. One child concentrates for longer, and more productively than another, and seatwork has an untidy habit of conforming to Parkinson's law and expanding to fill the time available. Indeed, in the Leeds research, our observational studies suggested that children used their time least efficiently in those subjects (language and mathematics) and those activities (reading and writing) to which most time was allocated, thus destabilising widely held assumptions about the relationship between time allocated (opportunity to learn) and learning outcomes. Conversely, the most work and the least distraction occurred in the rarest activities (Alexander 1995: 147-158).

These examples remind us of the apparently unbridgeable divide between quantitative and qualitative educational research. By and large, policy-makers—in the UK at any rate—prefer quantitative research because of its clarity, its definitiveness, its generalisability, its lack of ambiguity, its purported objectivity, and its capacity to be translated into costable policy options (they would tend to be quite happy, for example, with the claims to objectivity of the OECD time-on-task formula above). By the same token, they are impatient with qualitative research for its opacity, its lack of generalisability, its obsession with the elusive and the problematic, its manifest subjectivity, and the difficulty of seeing whether, in policy terms, it leads. In the same way, qualitative researchers pronounce policy-makers guilty of over-simplification of the inherently complex, while policy-makers see qualitative researchers as a group more interested in talking with each other than in doing research from which teachers and pupils can benefit.

Quantitative and Qualitative: An Unnecessary Polarisation?

There are many who believe that this polarisation is both unhelpful and unnecessary and that the two traditions can in fact be combined. I am one of them. At the 1995 DPEP seminar, I drew on my own empirical work over the past decade—especially the Leeds and CICADA projects—to build up a case, in the context of our joint endeavour to improve the quality of primary education, for attention to four key aspects of classroom life (Alexander 1995b)

- the *tasks* which teachers design and pupils encounter as the means by which learning is structured;
- the *time* which teachers and pupils spend on teaching, learning tasks and contingent activities, and which is a major determinant of both learning and opportunity to learn;
- the *talk* which teachers promote and through which pupils come to learn and understand, whether through direct instruction or pupil-pupil collaboration;
- the *text* or other material resource which carries the pupil's learning forward from the point of interaction into independent practice, revision, consolidation or development (cf. Bennett et al. 1994).

My rationale for pursuing these "four Ts" of pedagogy was not their amenability to empirical study but their importance in the learning process as demonstrated by a wide and very eclectic range of studies, including many of those surveyed by Peter Mortimore at last year's seminar (Sammons et al. 1995). In particular, I was interested in investigating the issue of *interaction* which had emerged from classroom studies on the one hand and psychological research and theory on the other as being one of the more critical conditions for pupil learning, especially at the primary stage. I started—as I believe we should all start—not from what is methodologically feasible, but from what is empirically necessary. Research ambitions are invariable modified in the light of methodological constraints, but the existence of such constraints should never deflect us from identifying the research questions which ought, somehow, to be addressed.

Thus, in the Leeds research into policy and practice in the 230 primary schools in one of England's largest cities (Alexander 1992), we used both quantitative measures and qualitative analysis to examine classroom interaction, the former to calculate the frequency of various categories of teacher-pupil talk and to show how these related to areas and aspects of the curriculum and to different kinds of learning task, the latter to examine in detail the character and dynamics of this interaction and its impact on those who participated in it. In the CICADA research (Alexander, Willcocks and Nelson 1996), we developed and trialled a procedure for breaking classroom discourse into its smallest components and showed, through computer analysis, how this yielded two contrasting teacher clusters: those whose discourse was dominated by direction, instruction and feedback, and those whose discourse was more exploratory and who were more concerned to question and elicit.

This work shows both the strengths and the weaknesses of the two traditions. Quantitative procedures in Leeds enabled us to generate and examine broad categories of classroom behaviour, to plot system-wide outcomes like pupil reading performance at the ages of seven and nine, and to show how these related, or failed to relate, to policy and resource inputs, yet in this as in so many such studies the outcomes in question were confined to those which could most readily be measured, and other curricular outcomes of fundamental importance were left unexamined. In the CICADA research, quantitative analysis of discourse yielded two highly suggestive clusters and, important in the context of the UK debate about the impact of the National Curriculum, showed how they were stable over time, regardless of the apparent trauma of educational reform, and how teachers' pedagogic habits are therefore extremely deeply rooted and resistant to change. At the same time, the analytic technique enabled us to say very little about the experienced *quality* of discourse or its impact on pupil learning. In contrast, the close qualitative analysis of interaction in the classroom practice part of the Leeds research enabled us to study and evaluate the reality, as experienced by pupils, of teachers' strategies for questioning, instructing, explaining, giving feedback and managing lesson time and pupil behaviour. It provided insights into classroom life which could communicate themselves readily to teachers and policy-makers alike simply because they preserved the forms and meanings of the language as uttered.

This brings me to what is perhaps the more critical bridging task in respect of the two research traditions. The argument is not—or rather it is but it ought not to be—about the pros and cons of quantification as such, so much as the *authenticity* and *application of* the data which a particular methodological approach generates. That is to say, the data should be capable of being matched against the real-life phenomena which they claim to represent; and in an applied research field like education, they should be translatable into options for policy and action. If a method produces data which, after analysis, do not stand the test of authenticity, or if, after analysis, the data yield no clues as to how the phenomena studied can be tackled in programmes of reform and improvement, then it is hard to see how the approach adopted can be justified.

PRIMARY EDUCATION IN FIVE CULTURES: A CASE STUDY OF THE POTENTIAL AND LIMITATIONS OF QUALITATIVE CLASSROOM RESEARCH

Let us test these arguments by drawing on the current stage in my sequence of research studies of primary teaching, which moves beyond UK contexts into international comparison The methodology is different once again. The Leeds study was a large-scale, five-year project which combined survey techniques with both quantitative and qualitative analysis of school and classroom events. The smaller CICADA study, which was principally concerned with educational change, set an exclusively quantitative analysis of discourse data gathered over a six-year period against a national survey of teacher perceptions of the impact of educational reform. The current project, *Primary Education in Five Cultures*, is a highly intensive study of aspects of primary education in England, France, Russia, India, and the USA whose main focus, once again, is the classroom.

Project aims

The aims of the "Five Cultures" project are as follows:

- To undertake a comparative analysis of aspects of primary education in five countries which exhibit marked contrasts in respect of geographic, demographic, economic, structural, political, ethnic and cultural variables, while sharing a constitutional commitment to democratic values.
- To focus such study at the levels of educational policies and structures on the one hand and educational practices on the other, giving particular attention to the interplay of policies, values, curriculum, pedagogy and discourse.
- To give particular attention to two pupil age-groups, six and nine year old, and to the teaching of language and literacy.
- To develop and test in the arena of international comparative study techniques of research derived from earlier empirical studies of primary schools and classrooms in the UK (Professional Knowledge 1986-87, PRINTEP 1986-91 and CICADA 1990-92), giving prominence to both qualitative and quantitative methods for analysing pedagogy and pupil-teacher discourse.
- To inform the debate about the future of UK primary education in respect of (a) priorities and structures for the curriculum, (b) the raising of educational standards, (c) teaching methods, (d) teacher expertise, training and deployment.

Project Timescale

The timescale for data-gathering has been as follows:

England:	(a)	Data for re-analysis—1986,1988,1992.
	(b)	New data-1995.

India: November-December 1994

Russia: (a) September-October 1994
(b) September 1995.

France: January-February 1995.

USA: March-April 1995.[1]

Research Instruments

All interviews and lesson observations were undertaken with specially-designed interview and observation schedules. In the case of the revisited English data from 1986, 1988 and 1992, the schedules were not the same as those used to gather the subsequent international data and the new English data. However, since the revisited English data exist in both audiotape/videotape and transcript form, this allows post-hoc analysis using the same techniques as will be applied to the international data from the other four countries.

For the 1994-95 international data, a special set of interview and observation instruments was devised, as follows.

Level 1 interview schedules

1a	Policy-makers/officials (opportunistic)
1b	School inspectors (opportunistic)
1c	Teacher trainers (opportunistic)

Level 2 interview schedules

2a	School heads (one per school)
2b	Class teachers (two per school; one for each pupil age-group studied)

Level 2 observation schedules

2c	Teaching sessions (a minimum of four per school: at least two for each pupil age-group studied; in fact in most schools the number of lessons observed and recorded was greater than this)
2d	Whole-school events (opportunistic: usually in the playground)
2e	Children at play (opportunistic, usually in the playground)

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[1] The USA has a highly devolved system of education, with wide variation in policy and practice both between and within individual states. We chose to focus on schools within three districts of the state of Michigan. The schools in India, a country also exhibiting great diversity, were in Delhi and Haryana.

The observation of teaching sessions involved two researchers working as follows:

Researcher 1.	(i)	Videotape the whole session.
	(ii)	Take still photographs of the teacher and children at work, of the classroom, and of the work produced.
Researcher 2:	(i)	Briefly interview the teacher before the session to establish his/her teaching intentions.
	(ii)	Draw plan of classroom.
	(iii)	Complete the observation schedule (2c above) as the lesson proceeds.
	(iv)	Complete the summary section of the schedule (stages of lesson, time distribution, subject matter, range and balance of teaching strategies and techniques, differentiation, pupil task-related behaviour, etc).

Dataset

The dataset for the four non-UK countries includes the following:

• Level 1 interviews (audiotapes, translations/transcripts and notes)	37
• Level 1 documentation	✓
• Level 2 school	22
• Level 2 interviews (audiotapes, translations/transcripts and notes)	48
• Level 2 observations sessions (videotapes, translations/transcripts and schedules)	91
• Level 2 hours of videotape	110
• Level 2 documentation	✓
• Level 2 photographs	1500
• Journals (1 for each set of country fieldwork)	4

The UK dataset includes the following:

• 1986 lesson observation sessions (videos, transcripts and schedules)	20
• 1988 lesson observation sessions (audiotapes, transcripts and schedules)	20
• 1992 lesson observation sessions (audiotapes, transcripts and schedules)	20

• 1995-96 lesson observation sessions (videotapes, transcripts and schedules)	10
• 1986 interviews (tapes, transcripts)	10
• 1988 interviews (tapes, transcripts)	20
• 1992 interviews (tapes, transcsripts)	10
• 1995-96 interviews	5
• 1995-96 photographs	200

To this should be added the extensive documentation on primary education in the UK, and the larger body of data from the three earlier projects within which the classroom material listed above is contextualised

Analysis: Generalisation, Insight, the Parts and the Whole

It would be a remarkable project which managed to achieve methodological consistency in work of this kind in countries as different as Russia, India, France, the USA and the UK. There is no need to spell out why this is so. Anyone with experience of cross-national fieldwork will understand the difficulties which attend the application of a methodology devised in one country for use in non-experimental settings in another, not to mention the practical problems of undertaking a project of this kind in contexts of political change and economic turbulence, as obtained, for example, in Russia. There are also considerable variations in the protocol and assumptions which greet requests to undertake educational research. In one country one might be granted relatively open access to officials, schools and classrooms. In another, access might be achieved only after a lengthy period of negotiation, and even then might be constrained or conditional. If I mention that for two of the countries the arrangements took no less than two years to negotiate, this will convey some sense of the challenges involved. However, I believe that the compromises which were necessary were in no case of sufficient severity to jeopardise the project's integrity—provided, that is, that one is prepared to accept the truth claims of research of this kind.

In this matter, the question of the *generalisability* of these data remains a critical one. There is a common and not unreasonable expectation that a cross-cultural study, whatever its methodology, ought to be able to yield national and cross-national insight, and that unless it does so it is scarcely worth undertaking. In this matter, much hangs on how hard-edged or positivistic is one's definition of "insight." Thus, while the Level 1 documentary data can inform sustainable cross-national comparisons on matters of policy, demography and the specified curriculum, any such claims for the Level 2 data must be made with considerable caution. The school sample, though purposive and constructed on the basis of expert advice in each of the four non-UK countries, was subjective and relatively small. Constructing either a simple or a stratified random sample of primary schools in even the smallest of the five countries was well beyond this project's resources, and there was a necessarily opportunistic and pragmatic element in the selection of schools, classes and teachers which other comparative researchers have also encountered (Reynolds and Teddlie 1995; Creemers et al. 1996).

Partly because of this methodological limitation in the present project, and partly because of the inherent dangers of any generalisations from the particular to the national in respect of schooling in countries of such immense size and cultural and linguistic diversity as Russia, India and the USA, the Level 2 analysis is less concerned with global comparisons than with the notion of *cross-cultural continua of educational ideas and practices.* Such continua—relating for example to curriculum scope and balance, to specific parts of the curriculum like language/literacy, to teaching methods, to classroom relationships, and to the overt or implicit values which inform these various features of classroom life—can be examined for culture-specific tendencies or in the case of the computerised analysis of classroom discourses, statistical clustering.

However, the central function of these kinds of data is to provide material for qualitative/interpretative analysis, and for extending our repertoire of possibilities for action and explanation at the micro-level of the classroom, rather than the purportedly objective national comparisons of the kind offered in the mainly economic and demographic studies provided by international agencies like OECD and the EU. The latter are relatively straightforward in their accounts of education precisely because they avoid tangling with qualitative data in general and the day-to-day processes of schooling in particular. They are not without their problems, however, as I have shown in respect of the key variable of time on task, and even with apparently uncontentious factual data it is possible for mistakes to be made: the EU's recent account of national educational policies is seriously inaccurate in respect of curriculum decision-making in the UK (Eurydice 1994: 77; Alexander 1996: 10-11).

Having expressed these necessary caveats about generalisability—which is, after all, the Achilles heel of most qualitative and all case study research—an important contrary argument needs to be represented. No two, ten, or perhaps even 100 schools can claim to be representative of a national system of education, even in a country as small as the UK, where there are only 25,000 primary schools, let alone the USA, where there are 80,000, or India where there are over 530,000 (Lockheed and Verspoor 1991). That being so, without the kinds of resources normally reserved for space or nuclear rogrammes, statistical representativeness and the insight available from sustained classroom observation may well be deemed incompatible.

However, it is surely reasonable to suggest that the culture in which all the schools in a country, a state or a region are embedded, and which most teachers and pupils in that country, state or region share, is as powerful a determinant of a school's character as are the unique institutional dynamics and local circumstances which make one school different from another. If this is so, three consequences follow: first, any one school, however unique, will tell us a great deal about the national system of education of which it is a part; second, the more searching the analysis of the individual school at the qualitative level, the more it will tell us about the culture which shapes it; third, a national study which tries to achieve statistical representativeness and generalisability by sacrificing intensity of analysis to sample size is likely, unless it really does have access to NASA-level resources, to fall between stools; it will neither be truly representative nor will it offer much by way of insight.

There is, therefore, a sense in which, if we are prepared to detach them from their usual sampling and statistical connotations, "representativeness" and "generalisability" can have meaning in the context of qualitative research. That, certainly, is the assumption which has underpinned the work of anthropologists for decades. If this is so, then qualitative researchers need to worry less about sampling than about their obligation to generate data which are (a) rich, diverse and suggestive, and (b) capable of being "revisited" for the purposes of analysis and re-analysis, by different methods and indeed by different people. Hence, in the "Five Cultures" project, the imperative of having, for every lesson observed, no fewer than five separate representations of the events in question: an observation schedule, completed in writing as the lesson progressed; a videotape which captured events in vision and sound; a transcript of all teacher-pupil discourse, prepared from the video sound track and translated where necessary; a battery of photographs; and a journal, completed daily.

There are three fundamental arguments for gathering data at this level of intensity, time-consuming though it undoubtedly is. First, each single research technique has its limitations: using more than one simultaneously allows the analyst to achieve a more convincing "fix" on classroom phenomena through triangulation. Second, if one is undertaking international comparative research on a limited budget (especially if, as in this case, it has taken two years to negotiate access) then replication is unlikely to be ambition: one has to try to return home with data which are as full and variegated as possible. Third, and most important of all, classroom life is far too complex and elusive to be captured and understood in full in one viewing. It is imperative to be able to re-visit what one had observed—once, twice, many times—to think about what one has seen, to re-run problematic or illuminating sequences over and over again, to share one's hypotheses with others, and to hear theirs. The latter is a particularly valuable element in cross-cultural research, when it is all too easy too make an interpretation which is ethnocentric or simply wrong (Tobin, Wy and Davidson 1989).

The more one studies videotapes of teachers and children at work, the more one sees. A major objection to the use of precoded observation instruments in the post-Flanders tradition as the sole tool for gathering classroom data is that it denies the researcher this vital opportunity. What you are left with is codings, a mathematical abstraction rather than an observable reality; what you have actually witnessed is lost for ever.

This brings me to what I suggest is the most critical difference between the two classroom research traditions with which this paper is concerned—the predominantly quantitative, measurement-oriented paradigms adopted in much school effectiveness research, and the qualitative approaches of ethnography and case study. The one seeks to understand and explain by identifying and examining the constituent parts; the other is concerned to portray the whole. One is essentially atomistic, the other holistic.

Each has its advantages and disadvantages as tools to understanding classroom life and the effectiveness of teacher actions. One is like a jigsaw: you apprehend the parts, but may not be able to assemble them into a coherent whole. The other is like a picture: perceive the whole, but may not understand how it is constructed.

The problem with which we are confronted in classroom research is that there is relatively little material which achieves the necessary feat of apprehending, and comprehending, both the parts and the whole in respect of teaching. In school effectiveness research, for example, we now have our ever-expanding lists of indicators of effectiveness at classroom level. We can say with confidence that opportunity to learn, use of advance cognitive organisers, maximising time on task, high cognitive emphasis, clarity of questioning, informative feedback and so on are prerequisites for achieving successful learning outcomes, alongside contextual and input factors like organisational efficiency and parental support. But we cannot show how all these elements—which in any case have been extracted and then aggregated from many different lessons, research studies and indeed countries—are to be reconstituted as successfully-conducted lessons with a beginning, a middle and an end. This means, also, that the capacity of this kind of research to feed convincingly into programmes for initial teacher training and longer-term teacher development may be somewhat restricted, since it is with wholes as much as parts that teachers necessarily deal.

This is not to say that a systematic focus in training on specific skills such as questioning, explaining and so on is not justified. It is, and many training courses in the UK use such techniques with conspicuous success. But teachers also need to think of the whole; the entire lesson, the sustained and coherent sequence of questions, answers, instructions, explanations, and tasks, as well as the individual elements in each of these sequences, and how all these relate to the subject-matter being taught and learned. Lessons, like music, have form and structure, they have themes which develop, sometimes along a prescribed path, sometimes unexpectedly and improvisationally; they vary in tempo, dynamics, timbre and mood. (The change of image from the visual to the musical is apposite, for like music, teaching is performance; and like music, teaching is governed by time.)

This may also mean, paradoxically for those who conduct educational research, that the more minutely we dissect the act of teaching, the more difficult will become our task of reconstructing it in a way which is meaningful to those practitioners to whom our efforts, presumably are chiefly addressed.

The imperative suggested by this dilemma, to which I shall return at the end of this paper, is that if school effectiveness research is to achieve the all-important transition from explaining teaching to improving it, must find a methodology which attends simultaneously to the parts and the whole, to deconstruction and to reconstruction, to events in isolation and to events in sequence.

In the "Five Cultures" research, the fact that the unit of classroom analysis is the *lesson*, and the data include complete [illegible] and, vision and on paper, ought in theory to permit [illegible]

Analysis: Themes

With these arguments in mind, the "Five Cultures" data will be subjected to various kinds of analysis in terms of six key themes:

- Policies and systems
- Schools
- Teachers
- Curriculum
- Pedagogy
- Discourse.

The paper, as I have noted, is not so much a report on the "Five Cultures" project as an account of its methodological dilemmas and how these are being resolved, prepared in the hope that it will make a useful contribution to the debate about how best to study and improve the quality of classroom practice in the context of DPEP. However, before we proceed to the project's treatment of classroom issues it is worth recording some of the "cross-cultural-continua" which have emerged from analysis to date within the first four of these themes:

- Policies/systems: centralised control—devolved control.
- Schools: school as community with superordinate identity—school as association of teaching units; head as educational leader--head as administrator/fellow teacher.
- Teachers: restricted professionalism—extended professionalism; limited autonomy—substantial autonomy.
- Curriculum: prescribed—negotiable; basics skills emphasis—broad educational foundation emphasis; cognitive/technical orientation—moral/societal orientation: collection code-integrated code; knowledge as absolute-knowledge as provisional.

Even in this shorthand form these represent significant cultural and contextual influences on the character of classroom pedagogy and discourse. For example, effectiveness factors relating to whole school organisation, policy, rules and ethos are strongly conditioned by assumptions about exactly what kind of an institution a primary or elementary school is . Factors like this have rather greater relevances, say, the English context where the school has a strong superordinate identity which is reinforced by devices like school assemblies, concerts and sports days than they do to the French situation where primary schools are much more a collection of teaching groups gathered together under one roof, a perspective only recently challenged by the French government's introduction of the school development plan, the *project décole,* as a formal requirement. Similarly, the notion of professional leadership by the head, a familiar effectiveness prerequisite, is highly dependent on national traditions in respect of the extent of authority, and the breadth of remit, which the head possesses. And factors like curriculum structure, clarity, advance organisers and so on have very different implications in the context of the basic skills of reading, writing and number than they do in the contexts of personal development, artistic development or education for citizenship.

Examples like these call into question the validity of non-contested lists of process variables of the kind which feature in some school effectiveness research frameworks, at least if such variables are tacitly defined as culture-neutral or context-free.

Analysis: Pedagogy

The issues emerging so far from the pedagogical analysis are similarly suggestive:

- Pedagogy: lesson structure; formulaic-idiosyncratic;
  lesson structure: developmental-episodic;

teaching group: whole class, group (teacher-led), group (collaborative), individual;

task focus: narrow - diffuse;

task generic activity (reading, writing, discussion, construction, apparatus, etc.): range and balance;

pupil ability/need differentiation: by task, by outcome;

teacher time: pace of teaching;

pupil time, distribution and use (working, on task, awaiting attention, distracted, etc.);

text (resources for teaching and learning): availability, kinds, quality and usage, by both teacher and pupils.

This list underscores my concern that holistic considerations are more important to a defensible analysis of pedagogy than the essentially atomistic quantitative tradition allows. Even the most apparently monolithic of teaching styles is rarely consistent over a given teaching session. For example, the pace of lessons varies (many start faster than they continue, and most seem to lose pace in their penultimate stage). Pupil concentration and time on task are subject to similar fluctuations. In both cases, far more helpful than calculating a mean rate for either is to know what causes the variation. Or again, aggregating elements of teaching from different lessons, however large the sample, is no help in understanding how it is that some teachers structure their lessons in a way which manages to preserve high levels of challenge, attention and interest throughout, while others may find these much more difficult to sustain; or why the teaching of some has a developmental logic which the teaching of others lacks. To return to my musical analogy, structure and form in teaching, as in much other human endeavour, are vital elements in the conveying of purpose and meaning. And there is probably a critical relationship between the nature of the learning task and the form and structure of the lesson which, like the other matters that have been exemplified, can only be discovered by holistic analysis.

The other aspect of the project's pedagogic analysis which it is important to stress here is the way cross-cultural study highlights the interplay of the *organisational*, *value* and *discourse elements* of pedagogy (Alexander 1996). Let us deal with discourse, separately, below. On the other two elements I would make two points.

First, pedagogical research has properly emphasised the importance of *organisation*, and comparative pedagogical research, including international studies of school effectiveness, is useful both in extending our repertoire of pedagogical possibilities and in making us aware of variants on the practices with which we are familiar. One of the most intriguing elements in this particular project is the extraordinarily wide range of practices which can be classified as "Whole class teaching" and the wide range of educational purposes which this one organisational strategy can be made to serve. Studying teaching within one's own culture one tends to presume that what one sees is the full extent of what is possible.

Second, pedagogical research in general, and quantitative paradigms in particular, have tended to neglect the *value* element in teaching. I refer here not to the teaching of values as an explicit aspect of the curriculum, but to the way, whatever the teaching method chosen, it conveys values and expectations in relation to learning, behaviour, knowledge, relationships, status, gender, and many other facets of life outside as well as inside the classroom. In effectiveness research, the components of teaching are completely detached from their value contexts, and indeed the affective and ethical tend not even to feature, yet we know that children are as sensitive to the affective antithetical messages of the classroom as to the cogitative ones, and that they are cultivated as much by how they believe the teacher views them, individually and collectively, as by the cognitive challenge or appeal of the learning task itself.

This becomes even more important when comparative study of pedagogy is drawn on to exert pressure for reform. This seminar, like last year's, is concerned with the *international* dimensions of school effectiveness. The basic assumption—and an admirable one—is that we can learn both from the educational practices of others, and from our own and others' attempts to compare and evaluate such practices. In England, during the last few months, international studies have fuelled a debate about the merits of whole class teaching at the primary stage, because it is being argued that the relatively poor showing of English pupils in international comparisons of educational attainment (for example, those conducted over the past thirty years by IEA and IAEP) is directly attributable to the prevalence of "progressive" methods in English primary schools. In contrast, because high-achieving countries like Japan, Taiwan and Switzerland use a great deal of whole class teaching it is being argued that this, chiefly, is what accounts for their high position in the educational league tables. Since these countries are also highly successful economically, there are those in England, including the Chief Inspector of Schools, who are prepared to argue that whole class teaching is the key not just to improved educational standards but also improved economic performance.

I do not propose, or need, to examine these claims in detail (I have done so elsewhere—Alexander 1996), but in the present context wish to make two points. The first is that this kind of attribution of cause and effect shows correlational research at its most naive: for quite apart from the myriad other factors which intervene between the act of teaching in the primary classroom and the performance of a country's economy, the near ubiquity of whole class teaching at the primary/elementary stage of education means that it can be shown to correlate, worldwide, with any or every level of educational and economic performance one cares to identify — low, high, middling, and all points in between.

Second, and returning to the neglect of *culture* in research on teaching, we need to understand that importing classroom practices from one culture to another is not as straightforward as it seems. As I said in respect of the current British debate:

> This is not just a matter of analytic clarity: there are important moral choices at stake. If the teaching methods of the admired Taiwanese, Japanese or Swiss classrooms are indeed *manifestations of* cultural values rather than merely *responses to* them, then we need to be clear whether, in the proper pursuit of pedagogic efficiency, we wish to import, along with the method, everything else that the method conveys to the pupils who experience it: messages about, for example, the extent to which knowledge is open or bounded, provisional or uncontestable; about how ideas should be handled, about the kinds of authority which teachers and curricula embody and the extent to which they may be questioned; about how individuals and groups should relate to each other; about the balance of individual autonomy and collective responsibility; about what counts as successful learning; and about what it means to be educated. We should also be alert to the power of pedagogy to deliver messages which may or may not be consistent with the educational goals which we espouse, just as we should understand that in importing a teaching method which we find admirable we may also import values with which we may be rather less comfortable. This, I stress, is an appeal not to covert xenophobia but to a proper understanding of the relationship between pedagogy and culture.
>
> Alexander (1996): 25

There are two final points to make about pedagogy in this context. First, there is an intriguing irony in the way that British policy makers are urging a return to whole class teaching at the primary stage while those in many other countries are becoming increasingly interested in group work and closer attention to developmental considerations. In these matters, clearly, we need to disentangle ideology from common sense and the necessary regard for the principle of fitness for purpose.

The other point is that in moving from judgements of what practices are effective to how teaching should be conducted in particular classroom contexts, we should maintain a clear sense of the opportunities and constraints which those contexts provide or impose. Thus, a belief in the value of group work should be tempered by recognition of the likely impact on the success of this strategy of large classes or limited teaching resources. It may well be the case that in certain circumstances it is both more realistic and efficient to refine existing teaching methods than to replace them by others.

If we take whole class teaching, for example, the process material from the "Five Cultures" project, especially from the French and Russian classrooms, shows it to be not in the least monolithic but highly variegated and versatile. My own judgement in the context of DPEP is that whatever other training needs are identified, the refinement and development of teachers' skills of whole class teaching, as a method which is widely employed in Indian primary schools, is an obvious and necessary element in strategies for training/retraining. Close and systematic attention to these skills could yield rapid and dramatic dividends in terms of pupil motivation, attention, participation and learning. In such a training programme, incidentally, video would be an important tool.

Analysis: Discourse

Language is the quintessential embodiment of culture, and teacher-pupil exchanges convey meanings not only about the cognitive content of learning tasks but also about the values from which these derive. If the former can be apprehended reasonably successfully in a cross-cultural study, the latter are rather more problematic.

At this point in the "Five Cultures" project, most of the discourse analysis lies ahead. The last stage of the classroom observation programme was completed in September 1995 (in Moscow), and most of the time since then has been taken up by having all the non English audio and video material (i.e., all the Indian, French and Russian interviews and videotapes) transcriptions were delivered and checked just three weeks before this seminar. This task has been complex as well as time-consuming. There have been technical problems to do with variable sound quality on the tapes, and there have been considerable linguistic challenges. The project's professional translators had to be persuaded to resist the urge to "tidy up" what they heard: many tapes had to be returned for re-translations, unfinished sentences and so on which characterise classroom talk (and, indeed, all human discourse). More fundamentally, we need to be satisfied that the translations were as accurate as possible in respect of meaning and idiom, and this requires cross-checks of tapes and translations involving other speakers of the languages in question.

The original plan was to subject the discourse data to a modified version of the three kinds of analysis developed for the Leeds and CICADA projects, that is to say, a combination of (a) the broad interaction categorisations (*work, monitoring, routine, disciplinary and other*) used on Leeds; (b) the qualitative analysis of discourse derived from the work of Edwards and Mercer (1987), also used on the Leeds data; and the computerised analysis from the CICADA project, which resulted from a coding of all utterances in terms of six coding systems: *discourse structure, speaker, pedagogic purpose, subject matter, participants* and *lexis*. It was hoped that this combination of techniques would yield significant findings about the deeper structures, as well as about the more readily observable features, of the way teachers and pupils relate to each culture.

It is now clear that the most ambitious and complex of these analyses (from CICADA) would be severely compromised by the act of translation. In the case of the Hindi, French and Russian-medium material, the words and structures to be analysed are not the words and structures uttered, and the CICADA technique focuses on discourse at the minute level of individual words, phrases and sentences. No translation, however meticulous and faithful, can replicate exactly the meanings which are expressed in another language. After trial studies of selected extracts, the quantitative framework for the discourse analysis is now in the process of being modified to a point where it is both simpler to apply and legitimate in terms of its use with translated material.

It is also becoming clear that while certain components of the analysis are reasonably stable across the five cultures, others are much more fluid. For example, using the discourse analysts' basic "stanza" of *initiation-response-feedback* (Sinclair and Coulthard 1975), and applying it in turn to teacher-initiated and pupil-initiated interactions, we can take a number of lessons from each country and plot without too much difficulty the following aspects, knowing that the objects of the analysis are equivalent regardless of language:

- frequency and balance of teacher interactions with whole class, groups and individuals;
- frequency and balance of pupil interactions with teacher, other pupils, whole class;
- proportion and location of pupils involved in one-to-one interactions with teacher and other pupils;
- length of the interactions classified above; broad content focus of these interactions: work, routine, disciplinary, other;
- frequency/balance of different kinds of discourse *initiation*: question, instruction, explanation, information, elicitation;
- frequency/balance of different kinds of question: closed/open/leading; narrow/discursive; contexted/not contexted;

- frequency/balance of different kinds of discourse *response*: narrow/discursive; embedded in the prompting question/diverging from the prompting question;
- frequency/balance of different kinds of discourse *feedback*: positive/negative; informative/uninformative.

The discussion which results from this kind of analysis is useful both for describing pedagogy and applying the insights of research to improving practice. It enables one to chart the broad character of classroom discourse, to compare classrooms and teachers, and, critically, to begin to assess its impact on pupils. If, for example, we find that the interactions are dominated by the same pupils, or a small minority of pupils, or boys rather than girls, or if we find that teacher questions are predominantly of the closed/recall type, or if we find that teacher feedback on pupil responses conveys little useful information, then we have significant levers for professional development.

However, as presented, this analytical framework remains disembodied from both curriculum content and cultural context. It therefore conveys relatively little about the *educational meaning and significance* of the exchanges. The first of these problems can be partly resolved by making the analysis subject-specific. In the "Five Cultures" project we are able to do this, by virtue of having included at least one language/literacy lessons the observation timetable for every teacher. However, even then our access to the full range of meanings being exchanged is relatively limited since the method of analysis requires their fragmentation.

The second problem is more intractable, and also more elusive to define. Cultural context impacts on pedagogy and discourse in the tangible ways which have emerged from research on primary/elementary schooling in countries like Japan and Taiwan (DFE 1992; Creemers et al. 1996; Raynolds and Farrel 1996), which highlights matters like societal/parental respect and aspirations for education, teacher status, teacher expectations and breadth/narrowness of goal focus at the primary stage. Important though these factors are, however, they are generalised and systemic rather than particular to individual classrooms. That is to say, they enable us to gain a purchase on broad differences between countries in respect of primary education, but not on the critical question of why one teacher, within a given country, is less or more effective than another.

The resolution of all these problems, I submit, requires us to analyse pedagogy and discourse holistically as well as atomistically, using the methodology of the detailed case study or narrative account of whole lessons to supplement and illuminate the isolation and quantification of general discourse features such as those listed above. Case studies can place their accounts of practice in an explicit framework of school circumstance, teacher intentions and classroom dynamics. They can describe in detail the situational problems and constraints which shape a teacher's decisions - and these, of course, can be dramatically different both between schools and describe the development of the content of the lesson, showing how it is presented and how different pupils respond to it, and analysing the kinds of challenges it poses.

Case studies can also explore that tangible but objectively undefinable feature which we call classroom "climate." They can examine the relationship between verbal and non-verbal communication: one of the most revealing elements to date has been the rather different meanings conveyed on the one hand by words on the transcript page, and on the other hand by words as reinforced or modified by the speaker's tone of voice, gestures and facial expressions, all of which are captured on the videotapes. The discourse is about much more than words. Case studies can probe the complex amalgam of messages which all classroom discourse contains: explicit and instrumental messages about subject-matter and behaviour; rather more implicit messages about the values which shape the views of knowledge and behaviour being conveyed. Above all, they can portray teaching in ways which are immediately recognisable to those who need or wish to apply the outcomes of the analysis to the improvement of practice.

The "Five Cultures" account of primary classroom discourse uses cross-data thematic analysis along the lines indicated, together with narrative case study, in order to convey the balance of the shared and the unique which must attend all educational comparison, and to enable us to examine both the constituents of discourse and the meanings which in combination these constituents conveys for the teachers and pupils involved.

CONCLUSION

This paper endorses the seminar's premise that classroom processes must be made central both to school effectiveness research and the programme of reform represented by DPEP. It does not accept, however, that classroom processes, beyond their more straightforward attributes, can be absorbed without difficulty into the existing methodology of school effectiveness research, or into the multi-level models typically used in the context of educational development.

The paper argues instead that qualitative and ethnographic research should be used, alongside quantitative analysis, for the following purposes:

- to enable researchers to gain access to those many and important areas of classroom life which are not amenable to quantification, including significant behavioural and discourse aspects of teacher-pupil and pupil-pupil interaction;

- to offset charges of methodological or over-simplification and capture something of the true complexity of classroom life;
- to enable research to balance analysis of the individual constituents of classroom effectiveness with understanding of how in everyday practice these constituents combine;
- to enable researchers, and the users of research, to access the educational meanings of classroom events, as experienced by teachers and pupils;
- to enable proper account to be taken of the context, cultures and values which shape, and are manifested in, what is observed and experienced in classrooms.

The paper also postulates a number of criteria for judging the value of classroom research of this more eclectic kind, alongside those like sample size, representativeness and so on, which are usually attended to. For example, classroom research might be expected to:

- balance *atomism* with *holism* in respect of classroom events;
- balance *data generalisability* with *data authenticity;*
- use multiple perspectives to allow *triangulation;*
- have potential for *revisiting* data by different analytical perspectives and procedures;
- be *accessible* to policy-makers and practitioners;
- have potential for *application* in the contexts of teacher training and development.

As presented here, I see research like the "Five Cultures" project as meeting most of these criteria, but not of itself delivering the conclusive judgements about pedagogical efficiency which mainstream school effectiveness research presumes that it can offer. On the other hand, I believe that the claims of the latter are somewhat overstated, and that we need instead a greater degree of realism and modesty in relation to what any one research paradigm on its own can provide. Intensive qualitative analysis of pedagogy and discourse, and the ready comprehensibility of narrative case study, are the essential companions to national and cross-national multi-level studies of this kind which have dominated school effectiveness research to date. The search for the grand, unitary school effectiveness research design which encompasses every significant aspect of context, input, process and outcome is methodologically unrealistic; it is also undesirable if it is driven by methodology *per se* rather than by the realities of life in schools and classrooms and the urgent questions about these realities to which we ought to be attending.

Finally, at various stages in this discussion I have hinted at training implications, since there is little point in establishing cause and effect in classroom research unless one is able to translate such findings into strategies of teaching. Among the claims which I make for according qualitative methods greater respect in the school effectiveness enterprise is their potential for ready translation into strategies for teacher training and development. In my own institution, the work on effecting this translation, especially through videotape and classroom observation, has already begun.

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Effective Classroom Environment for Students' Satisfaction and Academic Achievement

Yin Cheong Cheng

This study aims at investigating how classroom environment is related to students' satisfaction and academic achievements in a sample of classrooms in Hong Kong primary schools.

The data of the study were taken from the 2nd stage (1994) of an ongoing project entitled "Educational Quality in Hong Kong Primary Schools." The design of the study is a cross-sectional survey involving 284 classes of mainly grade 6 students in 90 randomly sampled primary schools. The total number of sampled students was about 134,520 The unit of analysis is the class.

The findings suggest that: (1) Satisfactions and academic achievements of students are strongly related to most of indicators of classroom environment; (2) Satisfactions and academic achievements have different sensitivity to different aspects of classroom environments; (3) To student satisfactions, social climate, class master's professional power, and quality of physical environment are in general powerful predictors; and (4) Students' academic achievements are more sensitive to class master's reward power (negatively) and position power (negatively). The finding supports the importance of class climate and class master's management style in prediction of student satisfactions and academic achievements. Also, different dimensions of climate may have different contributions to different aspects of satisfaction or academic achievement.

The profiles of the four typical classroom environments provide a clear pattern for teachers and administrators to understand the potential impacts of classroom environment and think about how to improve it for students' learning and development. Further implications for research and practice are also discussed in the paper.

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improvement of students' learning environment is one of the major foci of current educational reforms in many countries and regions. In parallel, a strong research tradition focuses on how classroom environment relates to student learning (Fraser 1986, 1987; Waxman & Ellett 1990, 1992; Fraser & Walberg 1991; Fisher 1992). This paper aims at investigating how the social climate, physical arrangements, management style in classroom are related to students' academic achievement and satisfaction.

Classroom environment may interact with students' personal characteristics and affect their learning attitude and behaviour (Lewin 1936). To improve educational outcomes, many researchers and practitioners are interested in the relationship between the classroom environment and learning (Fisher 1992). Different researchers conceptualise classroom environment differently. Some researchers emphasise the impact of the physical aspect of the classroom environment whereas others focus on how the social environment in the classroom affects students' educational outcomes.

According to Cheng (1994), school internal environment is the context of learning that consists of the physical environment and psychological environment. The physical environment of the school and classroom includes facilities, spaces, lighting, ventilation, desks and chairs, and air pollution etc that provide safety and comfort to promote learning and student development. The psychological environment often refers to the social quality of the school and classroom, especially the aspects related to perceptions and feelings of social relationship among members. The terms classroom psychological environment, classroom atmosphere, classroom social climate, classroom social interactions, and classroom social relationship are often used interchangeably when scholars investigate the classroom learning environment.

Many different measurements describe classroom social environment (Fraser 1992). Among them, Moos & Trickett's (1974) The Classroom Environment Measure, based on the Murray's (1938) conception of environmental press, may be one of the most important measures. This instrument assumes that the consensus of individuals when characterising their environment constitutes a measure of climate and that this climate exerts a directional influence on behaviour. It focuses on the measurement and description of teacher-student and student-student relationships and on the organisational structure of the classroom. This instrument characterises the classroom environment as having four levels: the relationship level, the individual growth level, the system maintenance level, and the system development level. The relationship level includes three indicators: involvement (the extent to which students have attentive interest in class activities and participate in discussion), affiliation (the level of friendship students feel for each other) and teacher support (the amount of help, concern, and friendship teacher provide towards the students). The individual growth level has two indicators: task orientations (the extent to which teachers complete classroom activity planning) and academic competition (the extent to which students compete on academic achievement or recognition). The system maintenance level includes three indicators: order and organisation (the extent to which students behave in an orderly and polite manner and classroom activities are well organised), rule clarity (the extent to which teachers demand on establishing a set of clear rules and are consistent in dealing with students who break rules), and teacher control (the extent to which teachers strictly implement the classroom rules). The system development level has only one indicator: teaching innovation (the extent to which teachers area innovative on teaching methodology and students participate in designing classroom activities).

In addition to the physical environment and social interaction among teachers and students, the management aspect of the classroom should not be neglected in studying the potential impacts of the classroom environment on student performance. In the classroom, a class teacher (or class master) often plays the role as a leader while students play the role as followers (Maehr 1990). The leadership and management of classroom can be determined by the power bases that a class teacher exercises in his or her class. According to French & Raven (1960), a class master can use the following types of power to influence students in classroom: reward power—power obtained from providing rewards; coercive power—power obtained from exercising punishment; position power—power obtained from school regulations or the position as a teacher; personal power—power obtained from the class master's own personality and charisma; and expert power—power obtained from the class master's professional knowledge and skills. Coercive power, position power and reward power mainly come from the role and position of the class master in the school while expert power and personal power come from the class master's own personal characteristics (Bass 1981). According to the literature of organisational behaviour in "adult organisations" (Podsakoff & Schriesheim 1985), expert power and personal power are generally positively related to subordinate performance, satisfaction with supervision, and job satisfaction, or at the least, are related. But reward power, coercive power, and position power are generally negatively related, or unrelated, to these subordinate criterion variables. It would be interesting to know whether a similar pattern of relationship between class master's power bases and students' educational performance exists in classrooms.

In Hong Kong, some schools and teachers emphasise too much on the public examinations and often use the lesson time of art, music, and physical education to do the academic subjects such as mathematics, English, and Chinese. Furthermore, some may give only very short recess time for students to have a break, to release and play, or to toilet. Obviously, these arrangements as part of the learning environment may have adverse effects on students' development and learning. Therefore, they should be included in studying of classroom environment, particularly in the context of Hong Kong.

Student performance that can be affected by the learning environment in classroom may include different aspects. Traditionally, academic achievements are often the most important or popular indicators of student performance. Therefore in the context of Hong Kong, students' achievements in the public examination on Chinese, English, and mathematics subjects may be used to assess students' performance. But conceptually, the effect of classroom environment on academic achievement may not be certainly so direct. It seems that classroom environment may influence students' affective performance such as learning attitude and satisfaction while it influences students' academic achievement. Also affective performance and academic performance may mutually influence. Furthermore, in terms of balanced education for student development, it may be more appropriate to use both students' affective performance and academic achievements as indicators of student's educational performance.

Based on the concept of quality (Crosby 1979, Juran 1988, Tenner & Detoro 1992; Cheng, in press), the quality of classroom environment should be at least reflected in the students' satisfaction with school life and learning. It seems appropriate to take student's satisfaction as a critical indicator in studying the quality of classroom environment. Borrowing the ideas from the literature on quality of work life and organizational behaviour (Cammann, et al., 1983, Oldman & Hackman 1981), students' social satisfaction (i.e., with social relations in school), intrinsic satisfaction (i.e., with opportunities to perform and learn), extrinsic satisfaction (i.e., with school arrangements), and over satisfaction (i.e., with the learning life in school) can be used as indicators of student satisfaction.

Even though the social environment, physical environment and arrangements, and management style seem to be the critical components of the classroom environment, unfortunately very few, if not none, studies integrate them to conceptualise a more comprehensive classroom environment and study how this environment is related to student's academic achievements and satisfactions in one study. Furthermore, there is lack of a research-based profile of effective classroom environment in terms of these important components for facilitating improvement of learning environment. This research gap limits tightly any effort to enhance quality of classroom environment.

The study aims at exploration of the above issue, investigating how the classroom environment (in terms of the perceived physical environment and arrangements, social climate, and class master's management style) is related to class effectiveness in terms of students' academic performance and satisfaction in a random sample of Hong Kong primary schools. It assumes that the physical aspect of the classroom environment in Hong Kong primary schools can be assessed in terms of students' perception of physical environment equality (mainly in facilities, spacing, neatness, cleanliness, and lack of pollution), appropriate length of recess time, and ignorance of art, physical education, and music (negative indicator). The social aspect can be described in terms of Moos & Trickett's (1974) nine dimensions of social climate among teachers (including all teachers who teach the class) and students such as involvement, affiliation, teacher support, task orientation, competition, order and organisation, rule clarity, teacher control and innovation. The management aspect of the classroom can be assessed in terms of class master's use of power (French and Raven 1968; Ho, 1989). Student performance can be assessed by students' achievements in the public examinations on Chinese, English, and mathematics subjects; and students' satisfactions with the social relations, opportunities to perform and learn, activity arrangements facilities, and overall learning life in the school.

In the study, the profiles of different types of effective and ineffective classrooms are mapped to provide a useful pattern for facilitating improvement of classroom process. The findings may deepen our understanding of the relationship between classroom process and educational outcomes and also make a contribution to the ongoing policy discussions and improvement of classroom environment and teacher management style in international and local contexts.

METHOD

The data of the study were taken from the 2nd stage of an ongoing project entitled "Educational Quality in Hong Kong Primary School." The design of the study is a cross-sectional survey involving 284 classes of mainly grade 6 students in 90 randomly sampled primary schools. The total number of sampled students was about 13,520. In general, all the classes of grade 6 in each sampled school were selected. If there were less than two classes of grade 6 in one sampled school, classes of grade 5 would also be selected.

Measures of Social Climate in Classroom

Moss and Trickett's (1974) instrument has been widely used in studying classroom social climate in different regions or countries and its reliability and validity has been well established and documented (Moss & Trickett 1974; Manor 1987; Ho 1989). In this study, the instrument had been adapted to the Hong Kong situation, including a total of 36 items with 4 items for each one of the nine dimensions of social climate. The dimensions are involvement, affiliation, teacher support, task orientation, competition, order and organisation, rule clarity, teacher control, and innovation. It should be pointed out that "Teacher Support" is very similar with leader's "Consideration" but the former refers mainly to all teachers for the class and the latter refers only to the class master. In Hong Kong, several teachers are assigned to teach different subjects for the class but only one of them is assigned as class master or class teacher to take care of the class all round. The instrument ask the students to describe their class on a 5-point scale. The estimated reliability alpha coefficient of these dimensions ranges from 0.67 to 0.86 in the pilot study. Also, the predictive validity of the instrument had been tested in different samples of students in the pilot study

Measures of Perceived Quality of Classroom's Physical Environment

In terms of physical facilities, spacing, neatness, cleanliness, and pollution-freeness, an instrument of 11 items was developed to assess quality of classroom's physical environment perceived by students on a 5-point scale. The sample items are "My classroom is not clean" (negative), "The classroom is very small and crowded" (negative), and "Noise often comes from outside when we have lessons" (negative). The estimated reliability alpha coefficient is 0.778 in the pilot study. The validity of the instrument had been tested in Cheng (1994a, in press) with a set of data of the first stage of the research project.

Measures of Inappropriate Length of Recess Time and Ignorance of Art, PE, & Music

Students are asked to rate one item about whether the length of recess time is insufficient and inappropriate for them to have a break, to release, and to toilet; and also to rate one item about how often the lesson time of art, physical education, and music is used to do academic subjects such as Chinese, English, and mathematics, on a five point scale. The latter item also represents these extent to which the art, physical education, and music subjects are ignored.

Measures of Use of Power

Based on the conception of power bases proposed by French and Raven (1968), Ho (1989) developed measures of position (legitimate) power, reward power, coercive power, expert power, and personal power of class master. For each measure of power, there are three items. The total 15 items ask the student to rate the reason why he/she would comply with his/her class masters on a 5-point scale. The sample items for position power, reward power, coercive power, expert power, and personal power are "because he/she is my class teacher," "because he/she will give me some rewards," "because he/she will punish me otherwise," "because he/she can help me to learn a lot of knowledge," and "because I respect him/her" respectively. The estimated reliability alpha knowledge, ranges from 0.57 to 0.78 in the pilot study. The validity is supported by the findings of Ho (1989), Cheng (1992), Cheng (1994b, in press) and the pilot study.

Measures of Individual Students' Satisfactions

Individual students' satisfactions are described by the measures developed from Cammann et al. (1983). They include social satisfaction (3 items), intrinsic satisfaction (3 items), extrinsic satisfaction (3 items), and overall satisfaction (1 item). The sample items for them are "I am satisfied with the relationship with others in school," "I am satisfied with the opportunities for me to learn new things," and "I am satisfied with the school's arrangments and facilities" respectively. The students are asked to rate them on a 5-point scale. Their estimated reliabilities were 0.77, 0.61, and 0.76 for social, intrinsic, and extrinsic satisfactions respectively. Their validities were tested in the pilot studies.

The unit of analysis is the class. In order to reduce response set across scales and cut down the time taken for students completing the whole questionnaire, the perceived physical environment measure and the two classroom arrangements measures were grouped in set A; the measures of individual students's satisfaction and four of the nine classroom climate measures in set B; and the other five measures of classroom climate and the measures of class master's power base in set C. These three sets were completed by three different groups of students randomly selected in each sampled class. The public examination results of Chinese, English, and mathematics subjects for sampled students were provided by the school principals. For each sampled class, the responses of students were averaged on each measure. Then, the averaged data were analysed by the statistical techniques.

RESULTS

The findings of preliminary analysis by Pearson correlation and Principal Components Analysis suggest that the measures of satisfactions, and academic achievement may be integrated as composite indices for further analysis. Therefore, the measures of social, intrinsic, extrinsic, and overall satisfactions were combined as one satisfaction index; and the achievements on Chinese, English, and mathematics were combined as one academic index.

Correlation between Student Performance and Classroom Environment

The Pearson correlations between student performance and classroom environment measures are summarized in Table [illegible].

The satisfaction and academic measures are strongly correlated with most of the nine measures of social climate and perceived physical environment. Comparatively, the students' satisfaction measures are more strongly correlated with class master's professional power and personal power than the academic achievements do. On the other hand, the students' academic achievements are more strongly and negatively associated with the class master's reward power and punitive power than the satisfaction do. And nearly all of the academic and satisfaction measures are strongly and negatively correlated with the class master's coercive power. In general, the academic and satisfaction measures are not so strongly correlated with the insufficient recess time and ignorance of art, physical education, and music.

Different Types of Effective and Ineffective Classes

According to the medians of academic index ([illegible]) and satisfaction index (3.65), the classes can be classified as "high academic (A+) classes" and "low academic (A-) classes" or "high satisfaction (S+) classes" and "low satisfaction (S-) classes." With the combination of academic and satisfaction, the classes can be identified as four types of effective and ineffective classes: "high academic and high satisfaction (A+, S+) type" (n = [illegible]), "high academic and low satisfaction (A+, -S) type" (n = [illegible]), "low academic and high satisfaction (A-, +S) type" (n = 54) and "low academic and low satisfaction (A+, -S) type" (n = 87). The "high academic and high satisfaction (A+, S+) type" should be effective in both academic achievements and satisfactions and the "low academic and low satisfaction (A-, S-) type" should

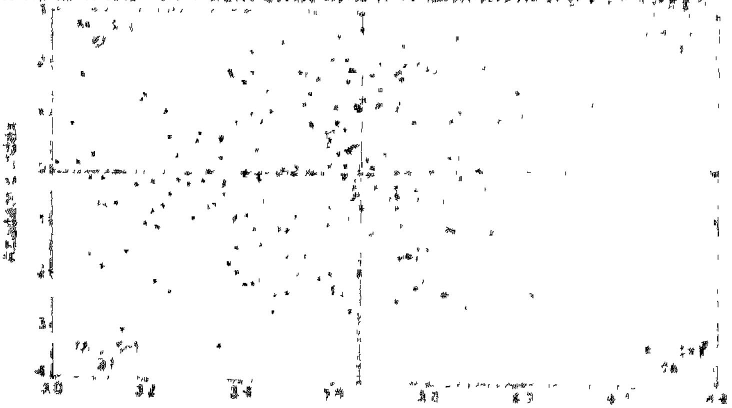

Figure 1. Distribution of the classes: Plot of academic index vs satisfaction index

TABLE 1
Correlation Coefficients

	Chinese	*English*	*Maths*	*Academic Index*	*Social Satisf.*	*Intrin. Satisf.*	*Extrin. Satisf.*	*Overall Satisf*	*Satisf Index*
(Classroom Climates)									
Affiliation	.2633**	.2848**	2927**	2869**	6473**	.3661**	4017**	.4526**	5463*
Order & Organisation	1862**	.2543**	.2093**	.2190**	.3717**	2757**	.3425**	.3322**	.3830**
Competition	.3541**	.2854**	.3116**	.3280**	.2646**	.3028**	2744**	.2428**	3266**
Involvement	2622**	3279**	.2762**	.2957**	.4805**	4592**	.4911**	4804**	.5611**
Teacher Support	1274	1480*	.1262	.1352	2604**	2176**	.3298**	3222**	3281**
Rule Clarity	.3649**	.3914**	.3763**	.3887**	3561**	.2381**	3352**	.3082**	3585**
Task Orientation	3398**	.3650**	.3298**	.3541**	.2758**	.1697*	.3214**	.3918**	3079**
Teacher Control	.0126	-.0074	.0195	0029	.2015**	.0837	.1776*	.1867**	.1872**
Innovation	0683	1055	.0748	.0797	.2531**	1697*	.2444*	2897**	.2735**
(Physical Arrangements)									
Classroom physical environment	2577**	.3404**	.2565**	.2904**	1915**	.4353**	2887**	2887**	.3355**
Insuff. recess time	-.0185	-.0671	-.0243	-.0302	-.1084	-0940	-2065**	-1117	-1681*
Ignorance of art, PE and music	-.1243	-.1493	-1180	-1363	-.0522	-0114	-1237	-1395*	-0829
(Power Bases of Class Master)									
Professional power	.0942	.0791	0590	.0797	.2115**	.2104**	2488**	2405**	.2655**
Position power	-.2837**	-.2667**	.2604**	-.2797**	.0291	-0839	-0231	0228	-0402
Reward power	-.4775**	-.4170**	-.4439**	-.4584**	-.1862**	-.0826	-.1000	-0749	-1198
Coercive power	.2341**	-.2198**	-.2247**	-2305**	-1508*	-0999	-1568*	-1642*	-.1537*
Personal power	-.1207	-.0648	-1172	-.1057	.1206	1291	.1681*	2077**	1824*

No. of Classes = 284, * p < .01, ** p < 001 be ineffective. The types of IA [illegible] represent partial effectiveness and partial ineffectiveness.

The distribution of the classes was plotted with the academic index against satisfaction index and the four types of effectiveness and ineffectiveness classes were illustrated as shown in Figure 1.

Different Types of Effectiveness and Classroom Environment

In order to explore the relationship between different types of effectiveness and classroom environment, two-way MANOVA was used to analyse the statistical group effects of academic achievement (high academic and low academic) and statistical group effects of academic achievement (high academic and low academic) and satisfaction (high satisfaction and low satisfaction) on social climate, physical environment and arrangements, and power bases in classroom. The results of MANOVA were summarized in Tables 2, 3, and 4.

The results of the multivariate tests in Table 2 show that the overall main relationship of type of effectiveness in terms of academic achievements (F=9.37***) and satisfactions (F=14.37***) to all the measures of social climate in classroom cannot be ignored. But their interaction effect is negligibly small. From the results of univariate F-tests, we can see that main ef-

TABLE 2
Classroom Climate and Types of Effectiveness
(2-way MANOVA)

Variate	Group Effect		
	Academic Index (AA groups)	Satisfaction (SA groups)	Interaction (AA x SA)
Multivariate F-Test (df=9, 271)			
All	9.37***	14.37***	.98
Univariate F-test (df=1,279)			
Affiliation	9.09**	58.24***	.63
Order & Organisation	2.71	39.21***	.65
Competition	18.63***	12.09***	1.45
Involvement	7.41**	84.01***	1.03
Teacher Support	.17	24.02***	.73
Rule Clarity	20.29***	28.45***	1.36
Task Orientation	18.40***	22.32***	.41
Teacher Control	1.14	10.46**	.99
Innovation	.14	19.62***	2.10

*p < 0.05, **p < 0.01 ***p < 0.001

tionships of the satisfaction index to all the measure of social climate reach at the 0.01 significance level and the main relationships of the academic index cannot be ignored only to some of climate measures such as affiliation, competition, involvement, rule clarity, and task orientation Comparatively, students' satisfactions seem to be more strongly related to social climate than their academic achievement.

TABLE 3
Physical Arrangements and Type of Effectiveness
(2-way MANOVA)

Variate	*Group Effect* *Academic Index (A+, A– groups)*	 *Satisfaction (S +, S– groups)*	 *Index Interaction (Acad. x Sat.)*
Multivariate FTest : (Df – 3, 276)			
All	4.55**	7.04***	.31
Univariate F-test: (df=1 278)			
Classroom physical environment	11.22**	21.18***	.00
Insuff. recess time	.01	3.07	.73
Ignorance of art, P.E. and music	1.52	.35	.05

* p < 0.05 **P < 0.01, ***p < 0.0002

The results of multivariate and univariate F-tests in Table 3 suggest that the main relationship of types of effectiveness in terms of academic index and satisfaction index to overall physical aspects of classroom particularly the perceived quality of physical environment cannot be ignored. Comparatively, the relationship to insufficient recess time and ignorance of art, physical education, and music is negligible.

TABLE 4
Power Bases and Type of Effectiveness
(2-way MANOVA)

Variate	*Group Effect* *Academic Index (A +, A – groups)*	 *Satisfaction Index (S +, S – groups)*	 *Interaction (Acad. x Sat.)*
All	11.59***	5 02***	.87
Univariate F-tests: DF=1,2790			
Professional power	.14	17.75***	1.49
Position power	13.80***	.04	.61
Reward power	45.41***	2.79	.41
Coercive power	2.16	5.39*	1.10
Personal power	5.62*	6.27*	1.72

*p < 0.05, ** p < 0.0.01, ***pp < 0.0001

The results of multivariate tests in Table 4 indicate that the overall mean relationship of types of effectiveness to all measures of classroom environment and power bases cannot be satisfaction index to class master's professional power, coercive power, and personal power and also strong relationship of the academic index to position power, reward power, and personal power. The interaction group effects of types of effectiveness are negligible.

In order to observe further the relationship of different types of effective and ineffetive classes to the characteristics of classroom environment, profiles of environment of four types of classes were mapped and compared.

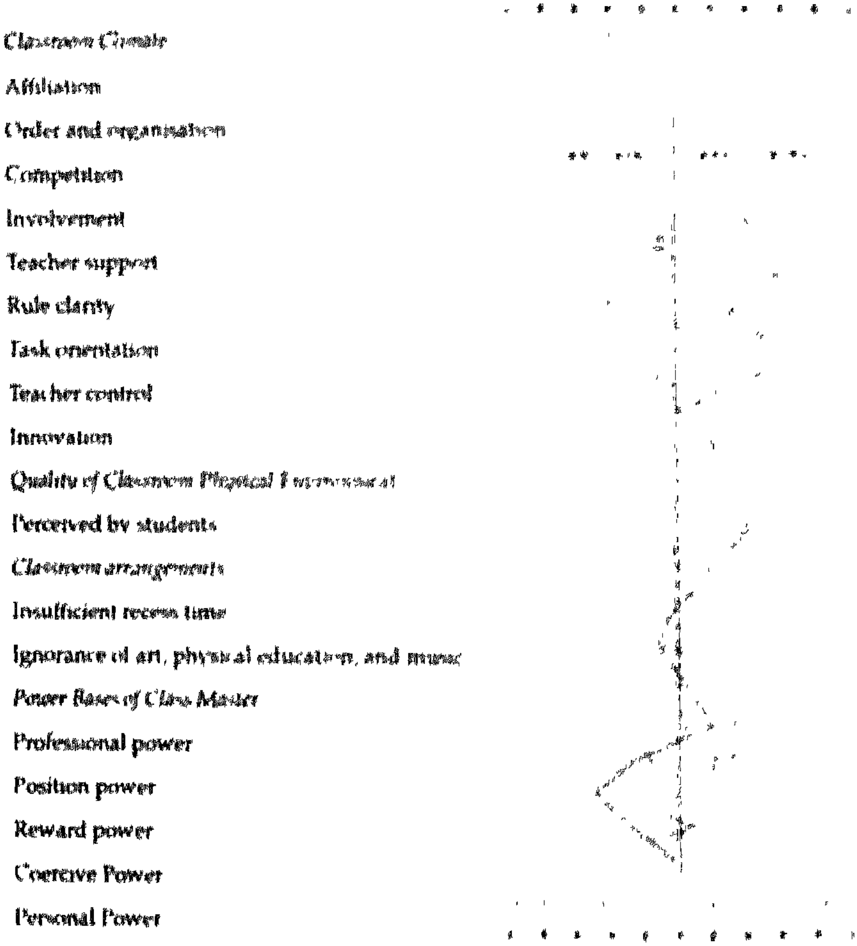

Figure 2. Profiles of 4 types of effective and ineffective classes

*p < .05, **p < .01, ***p < .001 for differences between A–S– and A+S+. All scores are z scores.

No. of case of A–S– = 87

No. of cases of A+S– = 66

No. of cases of A–S+ = 34

No. of cases of A+S+ = [illegible]

All the variables of classroom environment were first standardised as z scores (i.e with mean equal to 0 and standard deviation equal to 1). Then the average profiles of classroom environment of the four types of classes were mapped as shown in Figure 2.

We can see that the four profiles of classroom environment are different. Particularly the profiles of (A+, S+) and (A-, S-) are contrastingly different in terms of all social climate measures except teacher control, perceived quality of physical environment, class master's professional power, position power, reward power, and coercive power. Nearly all the above differences between these two profiles reach the 0.001 significance levels. In general, the satisfaction index seems to be a more sensitive indicator of classroom environment than the academic index.

Different types of effective and ineffective classes represent different quality of learning life the students experience in their classrooms. In (A+, S+) type classrooms the physical environmment is perceived as equipped with appropriate physical facilities, having enough spacing, neat, clean and out of pollutions the class master influences the students through his/her professional knowledge but not so much extrinsic rewards, position power, and punishment; social interactions are perceived quite positive in that students have attentive interest in class activities and participate in discussion, have good social realtionships with each other, behave in an orderly and polite manner, and compete with each other for achievement and recognition, and that teachers (not only the class master) for his class are supportive and task oriented, establish rule clarity, well organise class assignments and activities, attempt to use new teaching techniques, and encourage creative thinking in the students. The students in these classes have higher academic achievements and satisfaction.

Contrastingly, most characteristics of the (A–, S–) classrooms are opposite to those of the effective classrooms. The above findings are quite consistent with Cheng (1994a) that used only students attitudes as criteria to investigate the influence of classroom environment.

CONCLUSION

The findings support that classroom environment (in terms of social climate, perceived quality of physical environment, and class master's management style in different power bases) is important not only to students' academic achievements on Chinese, English, and mathematics subjects but also to their satisfaction with the social relationship, opportunities to learn and develop, arrangements and facilities in school It is interesting to find that student satisfactions, and academic achievements may have different sensitivities to different aspects of classroom environment. Comparatively, satisfaction is more sensitive to social climate, class master's professional power, and perceived quality of physical environment. Academic achievement is more sensitive to class master's position power (negatively) and reward power (negatively).

The profiles of different types of effective and ineffective classes provide a clear pattern for improvement of classroom environment and further study in this area.

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An Eclectic Approach to Estimating the Determinants of Achievement in Jamaican Primary Education

Paul Glewwe, Margaret Grosh, Hanan Jacoby, and Marlaine Lockheed

This article estimates the determinants of cognitive skills in Jamaican primary education. We take an eclectic approach, integrating the production function framework favoured by economists with the concerns of educators about pedagogical processes and those of sociologists regarding school organisation and management. At the same time, we correct for selectivity biases induced by school choice. We use an unusually rich data set, the 1990 Jamaican Survey of Living Conditions, which includes not only scores on cognitive achievement tests but also detailed information on each child's household and the primary school he or she attends. We find that all three components physical and pedagogical inputs, pedagogical practices, and school organisation and climate—influence student achievement. Our policy simulations suggest that a focus on inputs alone may be misplaced in school systems with input levels as high as those found in Jamaica; school reforms that concentrate on just a few pedagogical practices could lead to substantial improvements in student achievement.

Primary education is a cornerstone of social development and a principal means of improving the welfare of individuals. It promotes economic growth—thereby reducing poverty—and enhances political, economic, and

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scientific institutions. Primary education also ameliorates the health and nutritional consequences of poverty (World Bank 1990, 1993). The benefits of primary education for development stem largely from the improved cognitive skills it imparts [illegible] problem-solving ability. Yet a large body of [illegible] education in many developing countries is inefficiently organised and that school-level implementation of suffocative strategies is particularly weak (Lockheed and Verspoor 1991). Thus, a key issue in education and development policy is how primary schools can more (cost-)effectively promote the acquisition of cognitive skills.

In this article we estimate the determinants of connective skills in Jamaican primary schools and use these estimates to evaluate efficiency enhancing policies. Our approach is eclectic, going beyond the production function approach favoured by economists (for example, Hanushek 1986) that focuses largely on inputs. We examine pedagogical processes, which are of concern to educators (for example, Wittrock 1986), as well as the organisational and management characteristics considered by sociologists and political scientists (for example, Coleman, Hoffer, and Kilgore 1982; Chubb and Moe 1990). This is not to say that economists are unconcerned with anything but educational inputs; Harbison and Hanushek (1992), for example examine the impact of teaching practices in Brazil. Rather, one could interpret our analysis as an "expanded production function" approach that examines many more characteristics of schools and teachers than are usually considered in the standard function approach. At the same time, because we have detailed household-level data, we are able to control for difference in home background as well as for selectivity biases induced by school choice. Concern with such selectivity issues—a mainstay in empirical economics has been consciously absent from most studies of school effects (for exceptions see Glewwe and Jacoby 1994; Jimenez and Lockheed 1994; and Harbis on and Hanushek 1992).

Section I puts our approach in perspective by reviewing the literature on school effectiveness and the determinants of cognitive skills. Section II describes the education system in Jamaica and sets the context for the present study. Section III describes the data, and section IV discusses the selectivity issue and the statistical method used to deal with it. The estimation results are presented in section V, and our policy simulations are performed in section VI. Section VII summarises the article.

I. SCHOOL EFFECTIVENESS: THE ISSUES

A major debate in the literature on school effectiveness (see Purkey and Smith 1983) concerns which school-level factors—inputs, teaching, and management—best promote connective skill formation, and which do so

TABLE 1

Input Effects on Primary School Achievement in Developing Countries

(Number of studies)

	Harbison and Hanushek				*Velez, Schiefelbein, and Valenzuela*			
Input category	*Number of studies*	*Positive effect*	*Negative effect*	*No. effect*	*Number of studies*	*Positive effect*	*Negative effect*	*No effect*
Physical inputs								
Facilities	34	22	3	9	70	23	2	45
Instructional materials	—	—	—	—	34	14	3	17
Pedagogical inputs								
Curriculum	—	—	—	—	45	13	30	2
Time: student-to-teacher ratio	30	8	8	14	29	3	10	16
Time: hours	—	—	—	—	60	8	34	18
Teacher quality: experience	63	35	2	26	68	31	4	33
Teacher Quality: education	46	16	2	28	62	25	2	35

—Not available.

Source : Harbison and Hanushek (1992); Velez, Schiefelbein, and Valenzuela (1993) most cost-effectively. This question has implications for educational budget allocations, specifically for whether governments should provide schools with a particularly effective set of inputs (for example, textbooks and other instructional materials), concentrate resources on improving pedagogical processes (for example, through teacher training and performance evaluation); or reform the management of the entire school (for example, through decentralisation, administrator training, and school supervision). In this section, we review the current state of knowledge on the influence of school-level physical and pedagogical processes, and organisation, climate, and control on the process of learning in developing countries.

Internationally, there is ample evidence that primary schools are differentially effective in producing learning (Creemers, Peters, and Reynolds 1989). Yet, recent reviews of the impact of physical and pedagogical inputs on student achievement in the United States have found that variations in these inputs are rarely related to variations in student achievement (Hanushek 1986). However, in developing countries some physical and pedagogical inputs have been found to be related to student achievement. Two recent reviews of this literature are summarised in Table 1. Each review examined two types of physical inputs: school facilities and instructional materials. Both concluded that school facilities have an impact on student achievement although Harbison and Hanushek (1992) concluded that the effect was more consistently positive (twenty-two of thirty-four studies) than did Velez, Schiefelbein, and Valenzuela (1993) (twenty-three of seventy studies). The Velez, Schiefelbein, and Valenzuela study was restricted to research from Latin America, a region that generally has higher quality facilities and less quality variation across schools; this could account for the reduced impact of facilities on achievement. The latter study also found that variations in the availability of instructional materials were positively related to achievement (fourteen of thirty-four studies) but not as strongly as suggested in previous reviews (for example Fuller 1987, Heyneman and Loxley 1983).

The pedagogical inputs most often examined are teacher quality, curriculum, and teaching time. Neither review found evidence that the last two were associated with greater learning, but about half of the studies examined found that teacher education had a positive impact on student learning. The other indicator of teacher quality—experience—was related to learning in about one-third of the Harbison and Hanushek studies and about 40 per cent of the studies in Velez, Schiefelbein, and Valenzuela. Two-thirds of studies of curriculum (reform) effects found negative relations to achievement, and two-thirds of studies of the effect of student-to-teacher ratio (a proxy for teacher-student contact time) found no effect or actually a positive effect. Velez, Schiefelbein, and Valenzuela found a positive effect for increased instructional time in only eight of sixty studies.

Another area of research has sought to indentify specific pedagogical processes related to student achievement (for example, Walberg 1986) Teaching quality, in contrast to teacher quality, has been found to affect student learning in the United States and other industrial countries (see, for example, Walberg 1982, Johnson and others 1981; and Postlethwaite and Ross 1992) Variations in teaching practices in developing countries, however, are only rarely found to be associated with variation in student learning (Anderson, Ryan, and Shapiro 1989). One recent review notes that student learning was associated with the teacher's class preparation time in five of eight studies, and frequency of homework in nine of eleven studies (Fuller and Clark 1994). Postlethwaite and Ross (1992) found that teacher assessment of student performance was consistently associated with higher levels of student learning in the three developing countries that participated in the International Association for the Evaluation of Educational achievement (IEA) study of reading literacy.

A final set of school factors influencing learning is that to which we refer collectively "organisation, climate, and control." In industrial countries, variations in management, organisation, and "school climate" are correlated with gains in student achievement. Specific characteristics found to distinguish "effective" from "ineffective" schools include principal leadership, emphasis on basic skills, orderly school environment, high teacher expectations for students, staff stability, parental involvement, and collegial relationships (Edmonds 1979; Rutter et. al. 1979; Purkey and smith 1983). These differences in the management and organisation of effective and ineffective schools have also been found in developing countries. Effective schools promote community and parental involvement, accord school-based professional autonomy and accountability, and are flexible with respect to their service delivery (see Levin and Lockheed 1993; Psacharopoulos, Rojas, and Velez 1993; and Raudenbush et al. 1992).

II. PRIMARY EDUCATION IN JAMAICA

Table 2 presents key indicators for Jamaican primary schools. Enrollment is nearly universal, at 98 per cent of the cohort of children six to twelve years old in 1987, and the average number of years required to produce a graduate from the six-year systems 7.2, which compares favourably with international norms.[1] Daily attendance, however, is rather low, averaging about 70 per cent. As will be seen in section IV, this low attendance leads to a difficult estimation issue.

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[1] Lockheed and Verspoor (1991, tab. A-12) show that the median difference in number of student-years needed to produce a primary graduate and the number of grades in primary school is 1.2 for upper-middle-income countries, 1.8 for lower-middle-income countries, and 4.0 for low-income countries.

TABLE 2

Quantitative Indicators of the Jamaican Primary School System, [illegible]

(Per cent unless otherwise noted)

Indicator	[illegible]
Enrollment of students age 6 to 12	[illegible]
Teacher-to-student ratio	[illegible]
Teachers with three or more years of college training	[illegible]
Student attendance	[illegible]
Repetition rate in primary schools	[illegible]
Repetition rate in all-age schools	[illegible]
Completion rate for grade 6	[illegible]
Time to produce a graduate (years)[a]	[illegible]
Net efficiency[a]	[illegible]
Students functionally literate at grade 6[a,b]	[illegible]
Students reading at grade 6[a,b]	[illegible]
Cost per student per year (U.S. dollars)	[illegible]
Government expenditure on primary education as a percentage of total spending (on education)	[illegible]

[a] 1989.

[b] American norms used.

Source: Years to produce a graduate and net efficiency are World Bank statistics, all others are from Travor (1990) Vol. II, p. 1

In Jamaica there are three types of schools for children in grades 1 to 6, pre-schools, primary schools, and all-age schools. The private prep schools account for less than 5 per cent of enrollment (Lockheed and Verspoor 1991), usually charge substantial tuitions, and are enrolled in public sector primary schools. The remainder attend the lower section (that is, grades 1 to 6) of the nine-grade all-age public schools. Both types of public school offer the same curriculum and use the same textbooks. Teacher pay scales and per-student subsidies are also the same across primary and all-age schools. Students not awarded a place in secondary school through [illegible] Common Entrance Examination continue their studies in all-age schools.

There are, however, historical differences between primary and all-age schools. The latter are much more common in rural areas, especially in remote rural areas, and so tend to be less well equipped and to be used more by poorer children (Planning Institute of Jamaica, 1992: 14-15). Formerly, primary school students were expected to attend academic high schools, and all-age students were expected to enter the labour force or continue their education in normal (teacher training) schools. Perhaps as a result, primary school students still generally outperform all-age school students on the Common Entrance Examination and have greater functional literacy (Trevor 1990, chap. 4).

The Jamaican primary school system provides substantial educational inputs, despite tight financial constraints. In 1990 per-student expenditures were about $ 181 for public primary education (World Bank 1993, ann. 1, tab. 5). Non-salary recurrent expenditures are low and have fallen over the past five years. After subtracting out utility payments over which there is little control, the government funds over which principals have ready discretion amount to only $ 2 per student per year.

As to physical and pedagogical inputs, the nearly universal enrollment shows that, at least at a minimal level, capacity exists to handle all children. Critics of that level cite that the system comes up 30 per cent short on space and that 40 per cent of available school places are in either bad or very bad condition (Tervor 1990:24). Student-to-teacher ratios, which averaged 43 : 1 in 1987, are also relatively high. But, about 90 per cent of these teachers have received training (Trevor 1990, vol.II, tab.I.II, p.25).

Regarding pedagogical practices, the curriculum has been reformed since Independence to reflect more Jamaican and Caribbean content, illustration, and images. Textbooks in basic subjects have been provided annually to all students under externally funded projects since 1982.

Finally, with respect to school management, schools are relatively autonomous in Jamaica. For example, the local Board of Education and principal hire and fire teachers and name them to internal school leadership positions such as vice principalships, grade coordinators, and senior teachers (James-Reid 1989:60). Miller (1990) reports that the degree of autonomy has led to substantial innovation in work-study, school feeding, curriculum reform, school organisation, and school financing.

III. DATA COLLECTION AND VARIABLE SPECIFICATION

The data used in this article come from the 1990 Jamaican Survey of Living Conditions (SLC), which collects detailed information on household structure, health, education, nutrition, consumption, and housing (see Grosh 1991 for a general description). The education data contain unusually detailed schooling information for all individuals of age twenty-five and under, including 1,151 children in primary-level schools. This section provides details of the data collection and the choice of variables for the analysis.

The 1990 SLC identified the school attended by all children in primary or secondary school in each household.[2] These 212 primary and all-age schools and 110 secondary schools became the sample for the school survey. The school administrator's questionnaire collected information on physical characteristics, school feeding programmes, expenditure on schooling, instructional materials, admission, completion, dropout and repetition, teachers and parents, school organisation, and communication. In addition, a teacher questionnaire was administered to up to ten teachers randomly selected in each sample school. All in all, 1,640 primary and all-age teachers and 972 secondary teachers were surveyed. The teacher questionnaire requested information on the teachers' teaching history, use and provision of text books, and use of class time. Both the school and teacher variables reflect the average environment in the school rather than that of the particular classroom in which each sample child was enrolled in 1990.

Our indicators of cognitive skills for this study are the California Achievement Test (CAT) measures of mathematics computation and reading comprehension. The small household-based sample of 1,191 children in primary school meant that no more than about 200 students could be expected to be in each grade. Thus a test was required that would yield comparable scores across all grade levels (that is, a vertically equated test). Because there are no vertically equated Jamaican tests and there was no possibility of developing one within the scope of this research project, other tests commercially available in English are considered. Several options were reviewed with the Jamaican Ministry of Education. The CAT was selected because of its technical quality and because it provides the fewest apparent concerns over cultural biases. It has proven to be a valid and reliable instrument to use in studying variation in achievement among Jamaican school children (see Harris 1993).

Children from the households in the SLC were traced to their schools for testing, then were taken out of their regular classrooms and tested together. The mean number of children tested per school was 2.3. A screening test was given to determine which level of the battery of complete tests was appropriate to a given child; thus each child took a test appropriate to his or her achievement.

Unfortunately, it was difficult to locate large portion of the children in their schools simply by using the informations gathered from the households because of a series of factors; the chronically low attendance rates observed among Jamaican students, differences between the colloquial names used for children in the household and the legal names used on school enrollment rosters, the time lapse between the October 1990 listing of children (and their schools) and the school surveys in March and September of 1991 (especially for the second wave of schools surveyed), and the impossibility for the interviewers to visit the schools more than two or three times. In the end, test scores are available for less than half of the children (508 of 1,152).

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[2] The listing was actually carried out as part of the October 1990 Labour Force Survey (LFS). The SLC is designed to cover a random subsample of [illegible] households of the [illegible] households covered in the LFS.

Although many children were not tested for reasons clearly unrelated to their potential performance on the CAT, absenteeism is not a random event and thus creates a problem. Table 2 shows that on an average day, 30 per cent of primary school students in Jamaica are absent and thus would not be tested. Because interviewers made repeat visits to schools to re-test absent children, this 30 per cent figure certainaly overstates the loss of sample caused by absenteeism, although by how much is difficult to say. The tested children has the following characteristics: 56.5 per cent were female, their average age was 9 4, household log per capita expenditure was 5.1, 55 per cent were from ordinary primary schools and 41 per cent from all-age schools, and 38 per cent came from urban areas. The children not tested had the following characteristics: 46.7 per cent were female, average age was 9.8, log per capital consumption was 5.5, 54 per cent were in ordinary primary schools and 38 per cent in all-age schools, and 48 per cent came from urban areas. Thus, children who were not tested were more likely to be male and from urban areas, which suggests that unobservables, such as motivation, might differ across samples as well. We return to this selectivity issue in section IV

Choice of School Variables

In addition to student characteristics (sex, grade, and age) and home background information (parental education and household per capita expenditure), we consider a wide range of school variables, which we divide into three categories: school physical and pedagogical inputs, school pedagogical process , and school organisation and climate. The inclusion of variables such as household income (per capita expenditure) is warranted because the achievement regression specified in the next section is not a structural education production function. The underlying structural production function includes school attendance, an endogenous variable that depends on household income; we have substituted out this variable in the reduced form equation that we estimate (see Glewwe and Jacoby 1994). It is also worth noting that the estimated impact of school variables on achievement may in part be attributable to their influence on school attendance.

Potentially our data would allow us to construct hundreds of school variables. Unfortunately, our degrees of freedom are constrained by the relatively small number of students in our sample, which limits the number of school variables we can use. We eliminate variables that do not show sufficient variation (for example, dummy variables where 95 per cent or more of the responses are in one of the two categories). We also try to avoid redundancy as much as possible, as well as characteristics that seem only tangentially related to the learning environment. Three years, since the design of the questionnaire, spent working with the Jamaican government on education policy questions gave us a sense of which variables were good measures of the object or process of interest. After applying these various criteria, we were left with forty-two school and teacher variables.

The remaining school and teacher variables include each set of factors thought to be important by the different sides of the debate on school efficiency. More specifically, the forty-two variables that were retained measure school quality in terms of physical inputs (the school facility, instructional materials, health related services), pedagogical inputs (curriculum, instructional time, and teacher quality), pedagogical processes (teaching practices in the classroom), and school organization, climate, and control (school autonomy, a work-centred environment, community involvement, orderly environment, and school type). In the Jamaican school system the central ministry is responsible for providing the school facility, instructional materials, and personnel; teachers largely determine which specific practices they employ in the classroom; and the principal may have some control over the "climate" of the school. Although indicators of these different aspects of school quality could potentially be highly correlated, empirically we did not find any of the correlations to be very large.[3]

IV. ECONOMETRIC SPECIFICATION

Parents in Jamaica have considerable freedom in choosing which school their children attend. Consequently, standard regression estimates, for example, ordinary least squares (OLS), of the determinants of student achievement may give biased estimates of the importance of school characteristics. If better schools tend to attract better students, these estimates would confound the direct effects on cognitive skills of changing school characteristics with the indirect effect of differences in the composition of the student body. Another potential selectivity bias arises when some students are not tested because they are absent on the day(s) the test is administered.[4] This section discusses both types of selectivity bias. Although we are able to address the problem of school choice, the problem of absenteeism defies an econometric solution.

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[3] As pointed out by a referee, correlations between the different school variables raise the issue that school inputs and pedagogical practices could be determined in part by school management practices, which would imply underestimation of the full impact of the school management variables (a problem that can be addressed [illegible] tural model). We do not pursue this point further, because the low correlations we observe suggest that serious underestimation is unlikely.

To understand the statistical effects of school choice, consider the two regression equations for the CAT scores of child i, one for students attending primary schools (equation 1) and one for students in all-age schools (equation 2):[5]

$$(1) \qquad CAT_{i1} = \alpha_1 + x'_i\beta_1 + z'_{i1}\gamma_1 + \varepsilon_{i1}$$

$$(2) \qquad CAT_{i2} = \alpha_2 + x'_i\beta_2 + z'_{i2}\gamma_2 + \varepsilon_{i2}$$

Where the x'_i and z'_i are vectors of student and school characteristics, respectively, and ε_{i1} and ε_{i2} are random disturbances. The disturbance terms represent unobserved factors influencing performance on the CAT, such as the ability and motivation of the child, and are assumed top be uncorrelated with x_i and z_i. We assume that observed student and school characteristics have the same influence in each type of school, so we constrain the βs and γs to be equal across school types, though we allow the intercepts α_1 and α_2 to differ.[6] We can rewrite our econometric model as

$$(3) \; CAT_i = \alpha_1 D_{i1} + \alpha_2(1-D_{i1}) + x'_i\beta + z'_i\gamma + D_{i1}\varepsilon_{i1} + (1-D_{i1})\varepsilon_{i2}$$

Where D_{i1} is an indicator variable taking on the value of one if the student attends a primary school, and zero otherwise.

In the simplest (and least realistic) case, that of random assignment of students to schools, both ε_{i1} and ε_{i2} are randomly drawn from the same distribution, and the mean of the composite error term in equation 3 is zero. OLS would then yield unbiased estimates of the parameters of equation 3 because the composite error term is uncorrected with the variables in x_i and z_i.

A more plausible model of school choice is one in which more able or motivated children are sent to the better schools (primary schools in the Jamaican context). In this case, we need to correct our estimates of the

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[4] A similar type of selection problem can occur when many students of school age are not enrolled in school. Those who do enroll may be a biased sample of children. Because of universal enrollment in Jamaican primary schools, this does not present a problem here.

[5] Private (preparatory) school students are dropped because there are only ten such students in the sample

[6] Before estimating this model, we allowed the Υ to also differ across school types and tested this model against the more restrictive specification given by equations 1 and 2 Although we rejected the restrictions at the 5 per cent significance level, we found that the parameter estimates of the unrestricted model were extremely imprecise, reflecting the large number of parameters in relation to sample size. We thus decided to restrict the Υ to be the same.

[illegible] the school [illegible] school to attend as follows.

$$(4)\quad D_{ij} = 1 \text{ if } w_j'\theta + u_j > 0$$
$$= 0 \text{ otherwise,}$$

where w_j is another vector of observable characteristics. The error term u_j represents the unobserved preference for primary over all-age schools. This error term is likely to be correlated with the ε's in equation 3, because both may reflect the importance the household places on education. If ε_1, ε_2, and u are jointly normal with an unrestricted covariance matrix, then we can write the conditional expectation of equation 3 as

$$(5)\quad E\left[CAT_{ij}|x_i, z_j\right] = \alpha D_{ij} + x_i\beta + z_j\gamma$$
$$+ D_{ij}E\left[\varepsilon_{1j}|D_{ij}=1\right] + (1-D_{ij})E\left[\varepsilon_{2j}|D_{ij}=0\right]$$
$$= \alpha D_{ij} + x_i\beta + z_j\gamma + \delta_1 D_{ij}\lambda_{1j} + \delta_2(1-D_{ij})\lambda_{2j}$$

Where $\delta_1 = -\sigma_{1u}/\sigma_1$; $\delta_2 = \sigma_{2u}/\sigma_2$, $\lambda_{1j} = \phi(w_j'\theta)/\Phi(w_j'\theta)$, and $\lambda_{2j} = \phi(w_j'\theta)/\left[1-\Phi(w_j'\theta)\right]$. In the latter two expressions, ϕ and Φ denote the normal density and cumulative density functions, respectively.

Equation 5 shows that, in general, the composite error in equation 3 has non-zero mean. Omitting the terms involving λ_{1j} and λ_{2j} could lead to biased OLS estimates of equation 3, the determinants of achievement. In particular, not taking into account the correlation between the dummy variable D_{ij} and the composite error term in equation 3 could give us a misleading assessment of the efficacy of primary compared with all-age schools. To correct this potential bias, we use the now standard two-step method of Heckman (see Maddala 1983, ch.8), first estimating equation 4 as a probit and then, in the second step, inserting estimates of the conditional mean correction terms (the λs) into equation 3 as additional regressors.

So as not to rely strictly on the carnality assumption to identify selection effects, we include a variable in w_j is not in x_i. This variable is the difference between the distances to the all-age and primary schools that the household reports as being nearest. In Jamaica it can be reasonably argued that the cost differential of sending a child to one public school over another arises mainly from this difference in distances from the household. Another way to achieve statistical identification is to include school quality characteristics of both types of schools in equation 4. The characteristic of the type of school not attended can then serve as identifying variables (see Glewwe and Jacoby 1994). However, for reasons explained in section V we do not use school characteristics in estimating equation 4.

sis. More generally, significant impacts from all three types of school variables would justify our eclectic approach

V. DETERMINANTS OF ACHIEVEMENT

This section presents estimates of the determinants of school choice and the determinants of student achievement Although the school choice estimates are not of primary interest, they offer some insights on primary education in Jamaica; therefore, we begin with discussion of these results.

School Choice and Selection Bias

We estimate the determinants of the choice between the two kinds of primary level schools in Jamaica—all-age and primary—using a profit mode. Before turning to these results, however, we must point out that as an empirical matter it is impossible to model the full school-choice decision. In Jamaica, particularly in urban areas, most parents face a wide variety of schooling choices. Our data do not provide us with informations on the characteristics of, and distances to, all the schools a child may potentially attend. We do know the distance of the household from both the nearest primary school and the nearest all-age school, but we do not know the other characteristics of these schools. We therefore assume that parents consider schools only in their parish (Jamaica is divided into fourteen parishes), and we use thirteen parish dummy variables to control for the differences in school quality (parish averages) between all-age schools and primary schools.

Table 3 presents our profit results for the school choice model on the full sample—with or without CAT scores—of 1,067 children (85 observations are lost because of missing data). The distance variable is strongly significant and has the expected sign. The farther away the nearest all-age school is in relation to the nearest primary school, the less likely the child is to be sent to an all-age school. Recall that this variable is the one plausible identifying variable in our school-choice model, so its statistical significance is heartening. Seven of the thirteen parish dummy variables are also significantly different from zero at the 5 per cent level, suggesting that important differences may exist in relative school quality between primary and all-age schools in different parishes. All-age schools appear to compare unfavourably in St. Catherine's (the omitted dummy variable), St. Thomas, and St. Elizabeth but compare relatively favourably in Portland, St. Mary, Trelawny and Manchester. We also include several household variables that may influence schooling choice: parental education, household per capita expenditure[7] a female child dummy variable, and the age of the child. But none, save father's education, are statistically significant. Better educated fathers appear more likely to send their children to a primary, rather than an all-age, school.

TABLE 3

Probit Estimates of School Choice, Jamaica, 1990

Variable	[illegible]
1	[illegible]
Intercept	[illegible]
	[illegible]
Distance to nearest school (miles)	[illegible]
	[illegible]
Parish dummy variables[a]	
Kingston	[illegible]
	[illegible]
St. Andrew	[illegible]
	[illegible]
St. Thomas	[illegible]
	[illegible]
Portland	[illegible]
	[illegible]
St. Mary	[illegible]
	[illegible]
St. Ann	[illegible]
	[illegible]
Trelawny	[illegible]
	[illegible]
St. James	[illegible]
	[illegible]
Hanover	[illegible]
	[illegible]
Westmoreland	[illegible]
	[illegible]
St. Elizabeth	[illegible]
	[illegible]

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[7] We treat this variable as exogenous to the choice of school. This assumption is reasonable because travel time and transport costs are likely to be small compared with [illegible] income

sis More generally, significant impacts from all three types of school variables would justify our eclectic approach

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TABLE 3

Probit Estimates of School Choice, Jamaica, 1990

Variable 1	*Coefficient* 2
Intercept	0.2330 (1.03)
Distance to nearest school (miles)	–0.0945 (–11.34**)
Parish dummy variables[a]	
Kingston	0.4294 (1.66)
St. Andrew	0.0834) (0.59)
St Thomas	–0.3298 (–0.93)
Portland	0.6937 (3.07**)
St Mary	0.8845 (3.81**)
St. Ann	0.3915 (2.01*)
Trelawny	0.8442 (3.64**)
St. James	0.0464 (0.22)
Hanover	0.4230 (1.87)
Westmoreland	0.4253 (2.24*)
St Elizabeth	–0.2601 (–1.35)

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[7] We treat this variable as exogenous to the choice of school This assumption is reasonable because travel time and transport costs are likely to be small compared with household income

1	2
Manchester	1 0140
	(5 26**)
Claredon	0 3511)
	(2.12*)
Other variables	
Father's schooling (years)	–0.0300
	(–2 11*)
Father's education missing	–0.0128
	(–0 10)
Mother's schooling (years)	–0.0222
	(–1 36)
Mother's education missing	–0.2785
	(–1 49)
Per capita household expenditure (Jamaican dollars)	–0 0218
	(–1 60)
Age of student (years)	–0 0189
	(–1 45)
	–0 0160
Female student	(–0 19)

* Indicates significance at the 5 per cent level
** Indicates significance at the 1 per cent level
Note: The sample size is 1,067. The log likelihood value is –600.17. *T*-statistics are in parentheses. Dependent variable equals one if all-age school attended, zero otherwise
[a]St Catherine's is the omitted parish dummy variable
Source Authors' calculations.

With the schooling choice parameter estimates in hand, we construct the conditional mean correction terms as described in section V and estimate the cognitive skills regressions. These regression, along with the descriptive statistics for the variables, are presented in Table 4. Only one of the four school-choice selectivity correction terms in the maths and reading regressions is statistically significant above the 10 per cent level. The coefficient estimates are not appreciably affected by the exclusion of these terms, which suggest that selectivity bias as a result of school choice may not be important in our data Of course, as discussed already, there may be other sources of selection bias that are sadistically important but that we cannot explore economically for lack of identifying information

TABLE 4

Descriptive statistics and Estimates of the Determinants of Math Computation and Reading Comprehension Scores in Jamaican Primary School, 1990

Variable	*Mean*	*Standard deviation*	*Male Computation estimate*	*Reading comprehension estimate*
1	2	3	4	5
Achievement				
Mathematics computation scaled score	605	140	n.a	n.a
Reading comprehension scaled score	512	159	n.a	n.a
Basic student characteristics				
Age of students (months)	124	21	–0.21 (–0.35)	0.51 (0.72)
Grade of students	3.33	1.70	46.98 (6.45***)	37.23 (4.34***)
Sex (1= female, 0 = male)	0.59	0.49	41.66 (3.19***)	77.64 (5.03***)
Home background				
Household per capita expenditures thousand of Jamaican dollars	4.70	3.09	8.74 (3.65***)	4.47 (1.60)
Father's education (years of school completed)	7.35	3.12	–0.41 (–0.18)	1.90 (0.70)
Father's education data missing (1=yes, 0 = no)	0.10	0.30	28.94 (1.22)	58.58 (2.10***)
Mother's education (years of school completed)	8.45	2.65	2.80 (1.02)	1.29 (0.40)
Mother's education data missing (1 = yes; 0 = no)	0.05	0.21	–11.84 (–0.36)	–25.05 (0.65)
First selectivity correction term	n.a	n.a	–4.72 (–0.28)	–9.00 (–0.45)
Second selectivity correction term	n.a	n.a	33.23 (1.83*)	2.15 (0.10)
School-level physical inputs				
School facility				
Classrooms not separated by walls (percentage)	69.0	30.0	–16.54 (–0.54)	–6.64 (–0.18)
Students with desks (percentage)	85	15.5	0.72 (1.23)	1.16 (1.69*)
Index of equipment[a] (range low = 0 to high = 7)	2.84	1.78	–8.42 (–1.41)	–5.48 (–0.78)
Number of specialised instructional rooms[b]	0.81	0.84	0.48 (0.04)	2.26 (0.15)
Reliability of electric service (range bad = 0 to good = 3)	2.15	0.96	–3.37 (–0.33)	–6.52 (–0.55)
Piped water (1 = yes; 0 = no)	0.73	0.45	–15.99 (–0.63)	30.35 (1.03)

1	2	3	4	5
Instructional materials				
Classrooms with usable blackboard (percentage)	92.0	12.4	0.21 (0.33)	0.67 (−0.85)
Index of instsructional materials[c] (range low = 20)	9.56	2.63	−2.45 (−0.65)	−6.16 (−1.45)
Index of writing materials[d] (range, low = 0 to high = 9)	3.85	1.71	−1.28 (−0.24)	6.58 (1.04)
Health				
Nurse available or visits (1 = yes, 0 = no)	0.70	0.46	−20.11 (−1.16)	−15.73 (−0.77)
School conducts eye tests (1 = yes; 0 = no)	0.17	0.38	51.79 (2.26**)	33.42 (1.23)
School-level pedagogical inputs				
Textbooks arrived two months or more late (1 = yes; 0 = no)	0.76	0.43	−36.40 (−1.78*)	−14.92 (−0.63)
Student-to-teacher ratio	39.4	7.8	2.06 (1.56)	1.30 (0.90)
Teachers with training in the last three years (percentage)	32.6	23.7	−3.87 (−0.10)	104.88 (2.26**)
Teachers with diploma or certificate (percentage)	84.4	22.1	48.70 (0.85)	−9.01 (−0.13)
Teachers' average primary teaching experience (years)	13.6	5.3	0.88 (0.39)	1.92 (0.72)
Pedagogical process				
Average intensity of testing students (0 = never, 5 = almost every lesson)	2.48	0.66	29.85 (1.85*)	40.73 (2.14**)
Time spent on whole-class instruction (percentage)	31.2	7.5	−3.63 (−1.67*)	−2.83 (1.12)
Class time teacher copies notes onto blackboard (per cent)	12.6	5.5	−0.31 (−0.10)	2.53 (0.72)
Class time spent instructing small groups (percentage)	15.4	4.7	−0.64 (−0.20)	−0.17 (−0.04)
Individual written assignment done during class-time (0 = never; 5 = almost every lesson)	3.69	0.77	−34.03 (−3.06***)	−35.50 (−2.81***)
Time spent providing individual instruction in class (percentage)	12.07	3.43	−0.29 (−0.09)	3.08 (0.79)
Use of textbooks in instruction (0 = never; 20 = almost every lesson)	8.19	1.17	10.14 (1.29)	21.69 (2.37**)
Lectures to whole class (0 = never, 5 = almost every lesson)	4.19	0.62	12.25 (0.81)	7.80 (0.45)
In-class homework review (0 = never, 5 = almost every lessons)	3.85	0.45	22.02 (0.95)	−27.60 (−1.01)
Students copy notes from blackboard (0 = never, 5 = almost every lesson)	4.05	0.52	−0.96 (−0.05)	−16.78 (−0.78)

1	2	3	4	5
School-level organisation, climate, and control				
School autonomy				
Relative influence of the Ministry of Education compared with the principal on the school's organisation[a] (ratio)	0.13	0.18	−11.49 (−0.21)	−3.03 (−0.05)
Principal's influence on the curriculum (range none = 0 to high = 6)	1.62	0.77	20.94 (1.12)	13.19 (0.60)
Teachers' influence on the curriculum (range none = 0 to high = 6)	2.14	0.79 (0.47)	9.04 (0.51)	11.42
Work-centred environment				
Curriculum or pedagogy first or second most common theme in staff meetings (1 = yes, 0 = no)	0.16	0.37	38.88 (1.71*)	43.58 (1.61)
Instructional assistance and leadership by principal (hours per week)	9.29	7.46	0.88 (0.72)	2.35 (1.65*)
Index of commitment to teaching basic skills and critical thinking (range none = 0 to high = 3)	1.79	0.41	11.17 (0.48)	0.55 (0.02)
Average frequency of receiving help from other teachers to improve teaching skills (range never = 0 to daily = 5)	1.29	0.82	−8.23 (−0.84)	21.20 (1.86*)
Community involvement				
Parents who attend PTA meetings (percentage)	27.9	18.9	−0.66 (−1.49)	−0.16 (−0.30)
Index of community involvement (range none = 0 to high = 2)	0.96	0.47	−3.99 (−0.22)	−9.79 (−0.47)
Orderly environment				
Uniform requirement strictly enforced (1 = yes; 0 = no)	0.32	0.47	29.51 (1.61)	28.11 (1.31)
Class time spent on discipline (percentage)	11.3	3.7	1.03 (0.28)	2.10 (0.48)
School type				
School operated in shifts (1 = yes 0 = no)	0.88	0.33	−23.11 (−0.87)	−39.70 (−1.29)
Students grouped by ability (1 = yes; 0 = no)	0.63	0.48	3.10 (0.16)	24.46 (1.07)
All-age school (1 = yes, 0 = no)	0.45	0.50	−42.20 (−1.62)	−46.00 (−1.56)
City school, Kingston excluded (1 = yes, 0 = no)	0.18	0.38	−10.69 (−0.38)	3.22 (0.10)
Rural school (1 = yes, 0 = no)	0.70	0.46	6.48 (0.24)	−2.76 (−0.09)
Adjusted R^2	n.a.	n.a.	0.36	0.32
F-statistic	n.a.	n.a.	5.912	4.218

n. a Not applicable
— Not available
* Significant at the 10 per cent level
** Significant at the 5 per cent level
*** Significant at the 1 per cent level

Note The sample size 355 Of the 508 children for whom test scores were available, 10 were dropped because they attended private (preparatory) school, 85 were dropped because they could not be matched with any school for which we had school and teacher questionnaires, and 58 were dropped because of incomplete data from the school and teacher questionnaires. t-statistics are in parentheses

a Available equipment in the school, including telephone, typewriter, television, computer, radio, and copying machine

b. Includes libraries, labs, and studios

c Includes maps, charts, science kits, and dictionaries.

d. Includes pens, pencils, paper, notebooks, complete set of required textbooks, and dictionaries.

e The influence of the Ministry of Education on the organisation of the school is scaled on a range from none = 0 to high = 12 The influence of the principal is scaled on a range from none = 0 to high = 18

Source: Authors' calculations

Student Characteristics and Achievement

As expected, children in higher grades outscored those in lower grades (see Table 4) We tested whether the linear relationship between grade and achievement was overly restrictive by entering dummy variables for each grade in an alternate specification The F-test could not reject the linearity assumption at the 5 per cent level. The mean achievement gain per grade is about 47 points for maths and 37 points for reading, a useful standard for comparing the magnitude of effects discussed later. After controlling for grade, the student's age had no significant effect. This is not surprising in Jamaica, where delayed enrollment, repetition, and drop-out in the primary grades are all relatively rare.

Gender also influences achievement, with girls showing much higher cognitive achievement than boys in both mathematics competition and reading comprehension. For the maths scores, age and grade being equal, girls' scores exceed boys' by about the amount learned in one grade of schooling. For the reading scores, the girls' advantage is two grades higher. Internationally, it is not unusual for girls to outperform boys at the primary level. For example, in a 1983 international study of maths achievement in nineteen education systems, boys outperformed girls in ten systems, whereas girls outperformed boys in nine systems (Robitaille and Garden 1989). In a 1991 study of reading achievement in twenty-seven education systems, girls outperformed boys in all systems (Elley 1992) And it is not surprising in the Jamaican context that girls outperform boys. After all, about 59 per cent of the placements into high schools (the most elite track of the secondary system) are awarded to girls (Miller 1088,P 4)

Students from "good" homes may do better in school for number of reasons more resources that promote cognitive learning at home, a higher value placed on school performance, or a generally calm, stable environment. We include several variables to measure these effects We also tried to include variables related to children's school behaviour; days attended, number of times late for school, and hours spent on homework, all referring to the seven days previous to the household interview. Only the attendance variable was significant (positive) in the mathematics regression and only the homework variable was significant (again positive) in the reading regression. Because these variables cannot be considered as exogenous, we left all of them out of the regressions reported here. Their absence has virtually no effect on the other parameter estimates.

Economic welfare, as measured by household per capita expenditure (again treated as exogenous), is strongly and positively significant for mathematics, but not for reading, children from poorer households have lower mathematics achievement. An increase in household per capita expenditure by one standard deviation implies a 43-point increase in mathematics—almost the same effect as an additional year of schooling. Exploratory regressions found little evidence that this effect varied across expenditure levels. Similarly, we found no significant interaction terms between household expenditure levels and school characteristics. Parental education, however, has no significant influence on achievement. One possible explanation for this is that the economic welfare variable used here is more comprehensive than what is usually available in other data sets. Thus, once its effects are sorted out from those of parental education, the impact of education per se disappears. Furthermore, Jamaican society is culturally rather homogeneous, and parental education levels are generally high when compared with those in other developing countries; therefore, even relatively less-educated parents may place importance on their children's education.

School Characteristics and Achievement

We now turn to the effects on the three categories of school characteristics, beginning with the physical and pedagogical inputs. Table 4 shows that only one such input, vision testing of students, has a significant (beneficial) effect on maths achievement at the 5 per cent level. Significant at the 10 per cent level in the maths regression is the negative effect of textbooks arriving late in the school year. Only one input variable has a significant impact on reading achievement at the 5 per cent level—teacher training received within the past three years, which causes students' leading skills to improve. In addition, availability of desks for students is significant at the 10 per cent level Overall, these results suggest that physical and pedagogical inputs may play only a marginal role in explaining cross-sectional differences in cognitive skills in Jamaica. Of course, the weak performance of these variables may also reflect downward bias in parameter estimates as a result of sample selectivity with respect to the students who were tested. Nonetheless, the differences in effects across subjects admit plausible explanations If maths teaching relies more on blackboards exercises than reading does, then vision tests are likely to be more important to match achievement than to reading. (In Jamaica, vision testing may also be a proxy for community involvement in the school, because these tests are often carried out by local charitable organisations, although this would not explain their lack of impact on reading scores) Likewise, we speculate that the content of recent teacher-training programmes has been geared more to reading than to maths skills, hence the stronger effect of teacher training in the reading regression

Next consider the effects of pedagogical processes One pedagogical process variable has a strongly significant (1 per cent level) impact on mathematics scores. Doing written assignments in class (seat work) has a strong negative effect on achievement. Two pedagogical process variables are significant at the 10 per cent level testing students has a positive effect on mathematics achievement, but time spent in whole-class instruction has a negative effect. On the reading side, one pedagogical process variable is strongly (1 per cent level) related to achievement, and two more are significant at the 5 per cent level Intensity of textbook use and the percentage of teacher time spent testing students have positive effects on achievement, but time spent doing written assignments in class detracts from learning. The results on written assignments in class and whole-class instruction do not, of course, imply that these practices are directly harmful. Rather, they may divert class time away from other uses that better stimulate learning.

Finally, we turn to school organisation, climate, and control. No variable in this category emerges as significant at the 5 per cent level in the mathematics regression, although the positive effect of discussing curriculum and pedagogy issues at staff meetings shows marginal (10 per cent level) significant at the 5 per cent level, but two are weakly significant at the 10 per cent level: hours of instructional assistance by the principal and the average frequency with which teachers help each other lead to higher scores. Finally, not the all-age school dummy variable is insignificant in both the mathematics and reading regressions, meaning that, once school and student characteristics observed are controlled for, there is no appreciable difference in average achievement between these two types of schools.

Overall, we find that variables measuring pedagogical processes are more often significantly related to student achievement than are physical and pedological input variables and school organisation variables It should be noted, however, that because Jamaican schools have such high levels of some inputs generally believed to be important in increasing learning (textbooks, writing materials, school feeding programmes, high levels of teacher certification), there may have been inadequate variation in the sample to measure their effects on achievement Alternatively, Jamaica may have reached the point of diminishing returns with respect to these inputs. Another, less sanguine, interpretation of our estimates is that selection bias resulting from school absenteeism has a greater impact on the school input coefficients team to does on the process and organisation coefficients, yet there is no a prior reason to think that this would be the case.

VI. POLICY SIMULATIONS

This section presents the results of policy simulations to explain the differences between all-age schools and primary schools and between ineffective and effective schools.

Closing the Gap between All-Age School and Primary School Characteristics

The gap in student performance between all-age schools and primary schools has long been a focus for those concerned with equity in the Jamaican primary school system. We can use our estimates from the previous section to shed some light on the following question· By how much would the learning of a child with a given set of home characteristics improve if he or she were transferred from an all-age school to a primary school? To do so, we predict the difference in composite learning scores in three steps. First, we predict maths and reading scores using just the school characteristics, by simply multiplying the school characteristic coefficients from Table 4 by the mean values of their respective variables for both all-age schools and primary schools. Then we take the differences between the predicted scores in each subject for all-age schools and primary schools. Finally, we add the two together to get a composite score differential. Of course, this amounts to giving equal weights to literacy and numeracy skills. Ultimately, policy makers must decide how much weight to put on each skill, and if unequal weights are chosen, the results given here may change somewhat. In the absence of such information, we simply weigh maths and reading equally.

The overall difference in the predicted composite score for an average child attending average primary school compared with an average all-age school is 139 points, as seen at the bottom of table 5. This difference is equivalent to about one and a half grades' worth learning Differences in measured school characteristics account for 50 points of the difference in composite scores. Of these 50 points, 37 are due to differences in physical and

TABLE 5

Predicted Composite Score and Characteristics for All-Age and Primary Schools and for the Bottom and Top 25 Per Cent of All Primary-Level Schools, Jamaica, 1987

Variable	*All-age and primary schools*			*Bottom and top 25 per cent of all primary-level schools*		
	Mean for all-age schools	*Mean for primary schools*	*Difference in total scores of all-age and primary schools*	*Mean for bottom 25 per cent of schools*	*Mean for top 25 per cent of schools*	*Difference in total scores of bottom 25 per cent and top 25 per cent of schools*
School level physical inputs						
School facility						
Classroom not separated by walls (percentage)	0.61	0.66	−1.18 (3.42)	0.64	0.57	1.66 (4.78)
Students with desk (percentage)	81.15	87.88	12.63 (8.56)	88.26	82.81	−10.22 (6.93)
Index of equipment[a] (range: low = 0 to high = 7)	2.58	3.17	−8.21 (7.69)	2.48	3.23	−10.32 (9.66)
Number of specialised instructional rooms[b]	0.83	0.74	−0.25 (2.57)	0.90	0.87	−0.09 (0.88)
Reliability of electric service (range bad = 0 to good = 3)	2.00	2.26	−2.58 (5.74)	2.19	2.13	0.64 (1.42)
Piped water (1 = yes; 0 = no)	0.58	0.90	4.53 (17.36)	0.58	0.81	3.24 (12.44)
Instructional materials						
Classroom with usable blackboards (percentage)	90.12	91.46	−0.61 (1.94)	94.48	87.90	2.99 (9.49)
Index of instructional materials[c] (range low = 0 to high = 20)	9.40	9.82	−3.60 (3.35)	9.77	9.35	3.61 (3.36)
Index of writing materials[d] (range low = 0 to high = 9)	4.22	3.64	−3.07 (6.76)	4.42	3.94	−2.56 (5.65)

Health						
Nurse available or visits (1 = yes; 0 = no)	0.60	0.57	1.25 (1.32)	0.74	0.45	10.40 (10.98)
School conducts eye tests (1 = yes, 0 = no)	0.17	0.25	6.86 (4.03)	0.13	0.42	24.74 (14.55)
School-level pedagogical inputs						
Textbooks arrived two months or more late (1 = yes; 0 = no)	0.77	0.71	2.80 (2.40)	0.87	0.61	13.24 (11.36)
Student-to-teacher ratio	36.18	42.72	21.93 (18.01)	32.48	41.87	31.56 (25.91)
Teachers with training in the last three years (percentage)	0.31	0.32	1.67 (1.42)	0.27	0.34	6.12 (5.21)
Teachers with diploma or certificate (percentage)	0.79	0.89	3.67 (11.50)	0.75	0.92	6.59 (20.66)
Teachers' average primary teaching experience (years)	13.23	13.58	0.97 (1.69)	12.84	14.20	3.78 (6.63)
Subtotal (physical and pedagogical inputs)	n.a.	n.a.	36.81	n.a.	n.a.	85.38
Pedagogical processes						
Average intensity of testing students (0 = never, 5 = almost every lesson)	2.44	2.51	5.00 (2.49)	2.22	2.75	38.01 (18.93)
Time spent on whole-class instruction (percentage)	30.98	32.50	−9.82 (7.15)	32.95	30.81	13.81 (10.05)
Class time teacher copies notes onto blackboard (percentage)	12.95	11.23	−3.83 (11.33)	12.76	11.96	1.78 (5.27)
Class time spent instructing small groups (percentage)	15.36	14.71	0.53 (4.65)	15.04	14.78	0.21 (1.85)
Individual written assignments done during time (0 = never, 5 = almost every lesson)	3.77	3.66	7.21 (2.46)	0.04	3.36	47.34 (16.17)
Time spent providing individual instruction in class	12.19	12.72	1.49 (3.85)	12.13	13.71	4.43 (11.44)

Variable	*All-age and primary schools* *Mean for all-age schools*	 *Mean for primary schools*	 *Difference in total scores of all-age and primary schools*	*Bottom and top 25 per cent of all primary-level schools* *Mean for bottom 25 per cent of schools*	 *Mean for top 25 per cent of schools*	 *Difference in total scores of bottom 25 per cent and top 25 per cent of schools*
Use of textbooks in instruction (0 = never, 20 = almost every lesson)	7.92	8 33	12 90 (6 90)	7 94	8 39	30 (7 65)
Lectures to whole class (0=never, 5 = almost every lesson)	4.22	4.17	–0.88 (1.43)	4 22	4.05	–3.45 (5 59)
In-class homework review (0=never, 5 = almost every lesson)	3 88	3 94	–0 32 (2 90)	3 98	3 92	0 34 (3 05)
Students copy notes from blackboard (0 = never; 5=almost every lesson)	3 95	3 97	0 43 (0 98)	3 93	4 02	1 54 (3 53)
Sub total (pedagogical processes)	n a	n a	11.85	n a	n a	111 67
School-level organisation, climate, and Control						
School autonomy						
Relative influence of the Ministery of Education compared tot he principal on the school's organisation[e] (ratio)	0 18	0.14	0.57 (4 68)	0.19	0 16	0 44 (3 59)
Principal's influence on the curriculum (range. none = 0 to high = 6)	1 62	1 48	–4 72 (5 66)	1.54	1 39	5 51 (6 59)
Teachers' influence on curriculum (range none = 0 to high = 6)	2 08	2 19	2 15	2 00	2 35	7 26
Work-centered environment						
Curriculum or pedagogy first or second most common theme in staff meetings (1 = yes, 0 = no)	0 20	0.17	–2 43 (1 47)	0 16	0.29	10 64 (6 42)

Instructional assistance and leadership by principal (hours per week)	8.58	8.82	0.79 (0.64)	6.65	11.42	15.40 (12.59)
Index of commitment to teaching basic skills and/or critical thinking (range none = 0 to high = 3)	1.73	1.78	0.58 (2.50)	1.84	1.71	1.51 (6.54)
Average frequency of receiving help from other teachers to improve teaching skills (range: never = 0 to daily = 5)	1.32	1.48	2.06 (3.39)	0.90	1.23	4.20 (6.89)
Community involvement						
Parents who attend PTA meetings (percentage)	25.32	29.59	–3.50 (4.11)	30.71	25.61	4.17 (4.91)
Index of community involvement (range: none = 0 to high = 2)	0.98	0.96	0.37 (1.05)	0.90	1.03	1.78 (5.05)
Orderly environment						
Uniform requirement strictly enforced (1 = yes, 0 = no)	0.30	0.41	6.10 (4.21)	0.23	0.45	13.01 (8.98)
Class-time spent on discipline (percentage)	11.17	11.83	2.05 (5.27)	10.10	11.44	4.20 (10.81)
School type						
School operates shifts (1 = yes, 0=no)	0.87	0.87	–0.18 (0.17)	0.94	0.71	14.19 (12.92)
Students grouped by ability (1 = yes, 0 = no)	0.65	0.62	–0.74 (1.14)	0.61	0.55	–1.78 (2.75)
Cith school, Kingston excluded (1 = yes, 0 = no)	0.13	0.16	–0.16 (1.35)	0.10	0.29	–1.45 (11.85)

Variable	All-age and primary schools			Bottom and top 25 per cent of all primary-level schools		
	Mean for all-age schools	*Mean for primary schools*	*Difference in total scores of all-age and primary schools*	*Mean for bottom 25 percent of schools*	*Mean for top 25 per cent of schools*	*Difference in total scores of bottom 25 per cent and top 25 percent of schools*
Rural school (1 = yes, 0 = no)	0 75	0 46	–1 09 (17 45)	0 77	0 48	–1.08 (17 25)
Subtotal (school-level organisation, climate, and control)	n.a	n a.	1.85	n a	n a.	60.40
All-age school intercepts (subtotal)	1	0	88 20 (55 64)	0 81	0 23	51 21 (32 31)
Total difference in scores	n a	n a.	138.66 (51 64)	n.a	n.a.	308 66 (46 39)

Note . The sample size is 355 Of the 508 children for whom test scores were available, 10 were dropped because they attended private (preparatory) schools, 85 were dropped because they could not be matched with any school for which we had school and teacher questionnaires, and 58 were dropped because of incomplete data from the school and teacher questionnaires Standard errors are in parentheses The standard error is calculated as the sum of the standard error on the match contribution and of the standard error on the reading contribution and ignores the covariance between the two sets of estimates (thus it is an upper bound on the true standard error)

a The index measures the available equipment in the school, including telephone, typewriter, television, computer, radio, and copying or duplicating machine

b Includes libraries, labs, and studios

c. Includes maps, charts, science kits, and dictionaries

d Includes pens, pencils, paper, notebooks, complete set of required textbooks and dictionaries

e. The influence of the Ministry of Eduation on the organisation of the school is scaled on a range from none= 0 to high = 12. The influence of the principal is scaled on a range from none = 0 to high = 18

Source Authors' calculations

pedagogical inputs, 12 to differences in pedagogical practices, and only less than 2 to differences in school organisation and climate variables. The relatively small differences in scores attributable to defined school characteristics is an indication of the small differences in mean characteristics between the two kinds of schools, especially for the latter two groups of variables.

Of the total difference in predicted composite scores, 88 points' worth is due to the dummy variable for all-age schools. This is residual difference (although is not statistically significant) that is not explained by either the measured school characteristics or by selectivity effects. Our estimates suggest, therefore, that changing the characteristics of all-age school may close only about 40 per cent of the gap in predicted composite scores between children in the two types of schools Subject to the limitations of our data, this exercise does not indicate that sizable improvements in student achievement can be obtained by converting all-age schools into primary schools

Closing the Gap between Ineffective and Effective Schools

To show the differences between "good" and "bad" schools, we perform analogous simulation. We do so by predicting scores and producing a composite score for each school. We then rank schools from best to worst. Schools in the top quartile, we define as "good' schools, and those in the bottom quartile, as "bad" schools.

The simulation results are presented in Table 5 The range in school performance is very large. the mean predicted score for schools in the bottom quartile is 309 points lower than that of schools in the top quartile, and this difference is equivalent to almost four grades' worth of learning Because the difference between the average predicted score for good schools and for bad schools is so much greater than the difference between the average for all-age and for primary schools, resources would appear to be better spent on improving bad schools from either track rather than on equalising the averages for the two tracks. Indeed, a few of the bad schools are primary schools, and 31 per cent of the good schools are all-age schools

Table 5 shows the sources of the 309-point difference between the good and the bad schools; differences in physical and pedagogical inputs account for 85 points; in pedagogical processes, 112 points; and in school organisation and climate, 60 points In this case, the 51-point difference arising from the effect of the dummy variable for all-age schools accounts for a much smaller proportion of total predicted differences. Assuming no serious problems of bias in our parameter estimates, bringing the bad schools to the standard of the good school on only four dimensions—conducting more vision tests, increasing the amount of time spent on testing students, increasing the intensity of textbook use, and decreasing the amount of time spent on doing written assignments in class—could reduce the performance difference between the two by more than 40 per cent. Of course, given the caveats already laid out in our discussion, these areas should not be the focus of government education policy without further research, perhaps in the form of randomised experiments

VII. CONCLUSION

Physical and pedagogical inputs, pedagogical practices, and school organisation and climate variables all appear to influence achievement among primary school students in Jamaica Indeed, it appears that physical and pedagogical inputs, usually the focus of economic studies, may not be the most important determinants of student achievement, because pedagogical process variables are more often significant.

Our policy simulations reveal that although primary schools are objectively better than all-age schools, there are much bigger differences within each type of school A randomly selected child placed in the average "bad" school (those in the bottom quartile of our school quality index) would lag almost four grade-levels behind a child in the average "good" school (those in the top quartile in quality) Meanwhile, the difference in performance for a student in an average all-age school compared with that for a student in an average primary school is about one and a half grade-levels Finally, our analysis suggests that concentration on just a few aspects of pedagogical process and school climate and organisation may lead to substantial improvement in student achievement However, we caution that, as with most studies of this gentre, we are unable to explain with statistical precision most of the difference between student achievement in good schools compared with bad schools, and we know that our results may suffer from selectivity bias because many students were not tested

There is undoubtedly much room for school improvement in many other developing countries. Before considering reforms, we believe that it is important to collect and analyse micro data and to conduct cost-benefit analysis wherever possible Unfortunately, our attempts at cost-benefit analysis were stymied by the difficulty of establishing costs for the pedagogical practice and school management factors that were found to be most important. Of course, nearly all analyses based on non-experimental data are subject to biases of various sorts Whether the school improvements suggested by such analyses ultimately work can be confirmed (or disproved) only by experimenting with them and rigorously measuring their effects.

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Raising School Effects While Ignoring Culture? Local Conditions and the Influence of Classroom Tools, Rules, and Pedagogy*

Bruce Fuller and Prema Clarke

How educators and researchers define and study school effectiveness continues to be shaped by two divided camps. The policy mechanics attempt to identify particular school inputs, including discrete teaching practices, that raise student achievement They seek universal remedies that can be manipulated by central agencies and assume that the same instructional materials and pedagogical practices hold constant meaning in the eyes of teachers and children across diverse cultural settings In contrast, the classroom culturalists focus on the implicitly modeled norms exercised in the classroom and how children are socialised to accept particular rules of participation and authority, linguistic norms, orientations toward achievement and conceptions of merit and status. It is the culturally constructed meanings attached to instructional tools and pedagogy that sustain this socialisation process, not the material character of school inputs per se This article reviews how these two paths of school-effects research are informed by work conducted within developing countries. First, we discuss the school's aggregate effect, relative to family background, within impoverished settings. Second, we review recent empirical findings from the Third World on achievement effects from discrete school inputs. An emerging extension of this work also is reviewed: How input effects are conditioned by the social rules of classrooms. Third, we illustrate how future work in the policy-mechanic tradition

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will be fruitless until cultural conditions are taken into account. And the classroom culturalists may reach a theoretical dead end until they can empirically link classroom processes to alleged effects. We put forward a culturally situated model of school effectiveness—the implications of which are discussed for studying ethnically diverse schools within the West. By bringing together the strengths of these two intellectual camps, researchers can more carefully condition their search for school effects.

How to Make Schools More Effective?

It has become a timeless question—one that troubles and intrigues policymakers, educators, and parents Two facets of the issue continue to engage the curiosity of scholars and observers of the school institution. On the learning-outcome side: What are the aims of culturally diverse communities when they seek to raise school effectiveness? That is, what is the daily treatment that they wish to administer to their children inside classrooms? Backing up from these (hoped for) cognitive and socialisation outcomes, what instructional tools and teaching practices are more likely to yield intended forms of learning?

Two major frameworks for studying school effectiveness have evolved since the 1960s Members of these two intellectual camps advance competing models for how schools work; they are separated by normative and empirical crevices that remain wide and deep The *policy mechanics*—spurred by central agencies' search for universal determinants of effective schools—have tried to empirically isolate those instructional inputs and uniform teaching practices that yield higher achievement. This line of inquiry, working from a production-function metaphor, has yielded impressive findings that distinguish those instructional tools which likely yield achievement effects within impoverished settings from those that usually do not (Fuller 1987; Heyneman & Loxley 1983; Lockheed, Verspoor, et al. 1991). This article updates empirical findings from this tradition, stemming largely from work in developing countries, and details how these findings have proven useful to policymakers and central budgeters. While variation in the level and mix of instructional materials is inconsistently related to achievement in the United States (Hanushek 1986) a similarly mechanical approach to teacher effects continues to be pursued: searching for discrete pedagogical behaviours that universally yield cognitive achievement gains (for reviews, Anderson & Burns 1989; Waxman & Walberg 1991).

The *classroom culturalists* emphatically object to this cultureless conception of the particular effects that different schools, located in diverse societies and ethnic communities, are attempting to realise These observers of schools focus on the normative socialisation that occurs within classrooms:

the value children come to place on individualistic versus cooperative work, legitimated forms of adult authority and power, and acquired attitudes toward achievement and modern forms of status (Apple 1990; Dreeben 1968; Durkheim 1956; Mehan 1992; Willis 1977). This line of analysis, until quite recently, has ignored links between child socialisation and narrower forms of cognitive achievement Antecedent inputs or classroom rules, manipulable by central education agencies, have not been of any particular interest, because the socialisation process occurs largely through a "hidden" curriculum.[1]

Our review does not deal with this second line of work in any depth. However, we will focus on how the policy mechanics are creeping into territory originally discovered by the classroom culturalists These intellectual developments are brightly illuminated by following the school-effects literature from developing countries which has evolved steadily over the past two decades Looking across societies, rather than remaining focused only on the United States, we see more variation in (a) the school's aggregate effect relative to the influence of family background within impoverished communities; (b) the influence of particular instructional tools or pedagogical variables, like textbooks or teacher training, relative to other discrete inputs; and (c) the contrasting socialisation agendas pursued by central educational agencies and local communities. Thus there is sharp variation in the local meanings attached to constant types of instructional tools and teaching behaviours.

Organisation of the Reviews

First we describe why the policy mechanics and their production-function metaphor remain influential in developing countries and international agencies, even as researchers in the West move further from input-output conceptions. Second, we review major findings from this line of work, broadening and updating earlier reviews that covered portions of this work (Fuller 1987; Lockheed & Hanushek 1988; Lockheed, Verspoor et al. 1991, Velez,

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[1] Colleagues reviewing earlier drafts have responded sharply to the labels of *policy mechanics* and *classroom culturalists* To be clear, we are not assuming that these two fields are mutually exclusive or that some of us do research with a foot in each camp. We do want to emphasise that researchers begin with quite different assumptions when their research design is grounded in one field or the other. And these distinctions hold real implications for how research programmes in the future will be formulated. As Steve Heyneman points out, from Emile Durkheim onward, several scholars have attempted to identify the moral and cultural ends to which school ingredients are organised and mobilised by states and educators. The issue for us is the relative priority placed on the universal and mechanical effects of school inputs vis-a-vis their cultural meaning and socialising effects—and how this may more thoughtfully shape the policy advice that we commonly advance

Schiefelbein & Valenzuela 1993) [2] We emphasise similarities and differences in which school factors raise achievement within primary versus secondary schools Third, we focus on how the policy mechanics have begun (a) to situate discrete school inputs within classroom, emphasising how instructional materials are mobilised within classrooms and the mechanisms through which effects are realised, and (b) to conditionalise their findings within national or local settings, thereby moving into the culturally constructed character of teaching practices and classroom rules Fourth, we conclude by outlining a culturally situated model of school effectiveness which pays serious attention to how school actors in different locales may variably define the meaning of instructional tools, pedagogical practices, and rules of membership within the classroom organisation Note that for the moment we narrowly define *achievement* as the acquisition of basic literacy and cognitive skills.[3]

The utility of culturally situating instructional tools and pedagogical behaviour within particular school settings has been brought to light by recent work on school effects in Japan and other Asian countries (Hess & Azuma 1991; Stevenson & Stigler 1992). How a strong socialisation agenda is wrapped around the technical task of raising cognitive achievement also is illuminated by work on the effects of Catholic schools in the U.S. (Bryk, Lee & Holland 1993) Even educational psychologists are moving away from universal constructions of cognitive development Rogoff (1990) and Wertsch (1991), for instance, emphasise how learning is culturally situated, whereby mentors and instructional tools—which are charged with meaning-filled rules of authority and task performance—mediate the surface-level content of what is taught and learned Cross-national study of educational policies and the administrative organisation of schooling has long been a vibrant field (recent reviews, Cohen & Spillane 1992; Cummings 1992; Fuller & Rubinson 1992). But local research is just now emerging on how the *local* organisation of classrooms and schools, including the meanings attached to the same instructional tools and teacher behaviours, can vary across cultural settings.

We argue that as the policy mechanics move from their search for universal effects of specific teaching tools and teaching behaviour—to specifying the local conditions under which these factors yield achievement gains—they are beginning to confront the issue of how these tools and pedagogies are actually perceived by local actors. Then, after local meanings of instructional tools and pedagogy are taken into account, the technical question of which particular tools and teaching practices are empirically related to achievement remains a pressing one. This is why bringing together the policy mechanics and the classroom culturalists provides an exciting frontier for how researchers study the culturally situated effectiveness of local schools

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[2] No altogether satisfactory term exists for societies that are not industrialised By *developing countries* we mean low-income societies that might be called part of the Third World, as well as somewhat more affluent nations, such as those found in east Asia, parts of Latin America, and eastern Europe No narrow and linear conception of "development" is implied.

[3] Earlier reviews have focused on research conducted within primary schools We have attempted to locate sound studies done at the secondary school level For a review of work on the effectiveness of private and public schools in developing countries, see Cummings & Riddell (1992)

CENTRAL POLICY AND THE SEARCH FOR UNIVERSALLY EFFECTIVE TEACHING TOOLS AND PRACTICES

The Resilient Production-Function Metaphor: Studying Schools Within Impoverished Settings

North American readers may be asking: Why do the policy mechanics—and their production-function conception of school effectiveness—continue to be influential? Certainly educational interest groups and policy-makers in the West—be they active around governments or local school authorities—continue to tussle over levels of discrete school inputs (pupil · teacher ratios, length of teacher training programme, mixes of instructional materials). Debates over inequities in school finance return tirelessly to per pupil spending levels, even when many parties realise that money will not equalise achievement outcomes. Indeed, since James Coleman argued that material school inputs influence achievement levels only slightly, especially relative to family background (Coleman et al 1966), educational researchers have tended to move away from input-output conceptions of school effectivensss.[4] The search for universally effective factors branched first into studies of school management and organisational culture. Second, the effective-teaching literature, initially hoping to identify universally efficacious pedagogical practices (e g., time spent on instructional tasks), has edged toward the more modest ground of conditionalising effects on the basis of subject matter being taught, the organisation of classroom tasks, or child characteristics and developmental appropriateness (e.g , Needels & Gage 1991).

Four forces have bolstered the production-function metaphor's credibility and policy influence outside the United States, especially in developing countries (a) After almost 20 years of empirical work, it is now known that under some conditions school effects on achievement are greater than family background influences within impoverished settings (Fuller & Heyneman 1989, Heyneman & Loxley 1983). Where this is true, policy-makers are now on much firmer ground in using the school as an instrument for reducing inequality. (b) The over 100 production-function studies that have been conducted in developing countries also have discriminated between those inputs that are more likely to raise achievement from those which are not. Third World government and schools in impoverished settings possess very scarce resources; evidence that helps to boost allocational efficiency is sorely needed and often listened to by policy-makers (c) Institutions that aim to raise achievement in impoverished settings usually fund research that informs central policy-making, and the levers available to central governments and international agencies are limited—usually confined to budget allocations and policies linked to time in school, instructional materials, teacher licensing, and training programmes Production-function research yields evidence that is useful to centralised policy mechanics. Central agencies, according to modern rules of development, are in the business of reducing inequality in pupil performance according to universal forms of achievement, not in reinforcing local literacies or forms of knowledge (Carnoy & Levin 1985, Fuller 1991) (d) Work in the classroom culturalist tradition has held less utility in the eyes of policy-makers Accumulated evidence on cross-cultural variability in meanings assigned to teaching tools and pedagogical behaviours by school actors, and how these "socially constructed inputs" influence achievement or child socialisation, remains scarce No body of literature from the classroom culturalist framework rivals the production-function literature in Third World settings In short, the classroom culturalists have yet to focus on how policy levers can be manipulated to yield higher achievement or boost learning of a different from[5]

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[4] A counter movement to Coleman's argument has reemerged recently, often in the context of school finance debates where sharp disparities in per-pupil spending levels persist Within the context of the Texas school finance debate, for instance, Ferguson (1992) found that teachers' scores on the state recertification exam and experience were highly related to early school achievement For the debate over whether material school inputs make a difference, and the conditions under which their influence may be higher, see Hanushek (1986) and Hedges, Laine, and Greenwald (1993)

Since the mid-1980s, even leading policy mechanics have pointed out serious limitations with their own paradigm. The original model emphasised the level and mix of discrete inputs that were dropped into classrooms, just as agricultural economists would view investments in the local site of farm production Production-function research outside of education, however, distinguishes between allocational and technical efficiency, the latter focusing on how the farmer or factory manager mobilises inputs and motivates workers Similarly, recent work in the Third World includes observation of how teachers mobilise inputs—textbooks, teacher guides, and libraries—within their instructional scripts (Fuller & Snyder 1991, Lockheed & Komenan 1989)

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[5] One exception Researchers and practitioners interested in cooperative learning have attempted to alter the cultural norms of classrooms But whether the pedagogical complexity entailed can be sustained within impoverished school contexts, within the West, or overseas remains to be seen (for review, Cohen & Spillance 1992)

Beyond this technical conception of teacher action, recent work also focuses on the school's organisational structure and the classroom's social rules Working from the policy mechanic frame, for instance, comparative researchers have looked esxtensively at variability in the amount and uses of instructional time. The concept of *opportunity to learn*—how much of the designated curricular content is actually covered during the school year—stems from cross-national studies of the International Association for the Evaluation of Educational Achievement (IEA; Anderson 1991, Westbury, 1989) While lagging behind work on teacher effectiveness in the United States, Third World school effectiveness researchers are now examining uniformities and variation in teaching practices across societies, how pedagogy is culturally constructed and understood by children, and the effects of different teaching behaviours on achievement (Anderson, Ryan & Shapiro 1989; Chapman & Walberg 1992, Tatto, Kularatne, Woo & Kang 1992).

The policy mechanic camp also has suffered historically from a tendency to generalise empirical findings from one country to other quite diverse settings. This stems from the strong desire of many international education advocates to show that James Coleman was wrong and that schools do make a difference in many societies. The hunger for universal remedies also stems from the desire of benefactors, such as the World Bank and central governments, to find simple investments (like textbooks) that raise classroom quality and achievement, independent of local conditions. Yet as empirical findings accumulate, the inevitable question keeps arising as to why the same factor exerts an influence on school achievement in one setting but not in another (thoroughly pursued by Schwille et al. 1986). This pushes researchers to more carefully conditionalise observed effects from school inputs and teaching practices (e.g, Jimenez & Cox 1989). And detailed below, this necessarily moves researchers into the culturally situated nature of instructional tools and teaching practices Advances in analytic methods also are sparking clearer assessment of scope conditions. For example, the development of hierarchical linear models is allowing researchers comparative researchers to more carefully look at the distribution of school inptus and child characteristics across differing communities, allowing researchers to formally conditionalise empirical findings (Raudenbush & Bhumirat 1992; Riddell 1989)

Finally, the original production-function metaphor assumes that the preeminent mission of schools and teachers is to raise cognitive achievement The modeling exercise has come to mechanically portray and reify the policy mechanics' own presumption about a certain form of learning that should occur inside classrooms But in developing countries (as well as within the West), children are being variably socialised to accept certain norms about authority, expertise, and social participation (Carew & Lightfood 1979; Dreeben, 1968, LeVine, Bidell, Fuller & Laserna 1991; Prophet & Rowell 1993) Current political emphasis in how to efficaciously use the school as an instrument to socialise children towards democracy—in eastern Europe, parts of Asia, and South Africa—clearly illustrates that cognitive achievement is simply one element of the intended classroom process. Emerging debates in Japan and China over how to socialise pupils to become more individualistic in their achievement orientation offer additional examples of how school effectiveness often has broader connotations than simply boosting cognitive forms of learning By ignoring this broader socialisation process, the embedded meanings of instructional tools and teaching behaviours will be missed, greatly constraining how researchers model learning inside classrooms.

This brings us to two questions. What are the basic findings from this long production-function tradition? How is the field moving to address these admitted weaknesses of the paradigm's core assumptions?

Current State of the Production-Function Art

What are the major lessons learned from the production-function tradition? How do these empirical patterns, based on evidence in developing countries, differ from how researchers have come to understand ingredients of effective schools in the United States and western Europe? To answer these quctions, we have collected empirical studies from developing countries, conducted since 1987, that estimate the effects of specific school factors on achievement, after controlling for the influence of students' family background. A portion of these multivariate studies for primary schools were pulled together by Lockheed and Hanushek (1988) and Lockheed, Verspoor et al. (1991) We also include the empirical articles contained in Fuller's (1987) initial review. We made a strong effort to uncover recent multivariate studies conducted within secondary schools, because earlier research focused on primary schools.

In selecting these recent articles, we have followed commonly used criteria: All studies included statistical controls on pupils' family background or involved random assignment of children to classroom experiments, and effects of specific school or classroom factors are included only when satistically significant at $p < .05$ or better. Hierarchical linear models (HLM) are constructed and assessed in a growing number of studies (Bryk & Raudenbush 1992). This addresses the satistical problems involved in simultaneously assessing factors that may operate at the school or classroom level when pupil-level background influences also are present HLM modeling provides the opportunity to explain why mean levels of achievement vary across classrooms or schools and why the distribution (or degree of inequality) in achievement also may vary among children within classrooms

Recent work suggests that the aggregate effect of schooling vis-a-vis family background can be seriously overestimated unless culturally sensitive indicators of social class and family differences are utilised (Lockheed, Fuller & Nyirongo 1989). This is an important model-specification issue It also represents a substantive breakthrough in how to better situate school effects within local settings, where the character and measurable indicators of social class differences vary substantially across societies. We return to this issue in Part 2 of this article. A related issue is the scarcity of longitudinal achievement data from developing countries (for exceptions, see Fuller, Hua & Synder, in press; Raudenbush, Kidchanapanish & Kang 1991, Riddell & Nyagura 1991). In the absence of pre-and post-test data, we continue to rely on cross-sectional associations and limited SES measures, rather than truly modeling how school factors influence growth in learning (Willett 1988, Willms & Raudenbush, in press).[6]

Several pitfalls emerge as one attempts to summarise the over 100 Third World production-function studies that have been conducted to date. Models vary in terms of the number and type of school inputs, management practices, teacher attributes, and (most recently) pedagogical practices that are included in multivariate estimations Accumulated evidence on school factors that consistently show no significant relationship to achievement is perhaps more convincing than significant findings, because the latter are more sensitive to differences in specified models Few researchers working in the Third World have reported effect sizes, rendering impossible a more precise meta-analysis. Models have rarely included interaction terms, nor have investigators systematically examined substitutability between different school inputs.[7] Cost data pertaining to specific school inputs are rarely reported. So, even when significant effects are observed, it remains difficult to assess the relative cost-effectiveness of alternative factors (for important exceptions, see Harbison & Hanushek 1992; Lockheed & Hanushek 1988). Scope conditions are infrequently specified. We return to a recent trend toward specifying general conditions under which particular factors are more likely to operate Notwithstanding these limitations, the overview of recent findings which follows is quite instructive [8]

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[6] More detailed discussions of model-specification issues pertinent to developing countries appear in Fuller (1987) and Harbison and Hanushek (1992).

[7] One exception is Lockheed et al 's (1986) study of how textbooks appear to raise pupils' maths achievement by substituting for specific teacher training in mathematics

[8] Difficulties in summarising this line of school effect research are detailed in Schwill et al (1986)

Basic Map of School-effects Studies

Table 1 summarises the range of investigations conduct two decades and findings for specific school factors Thi are notable. First, comparing columns 1 and 2, one can se studies have been done within primary schools, compa schools At the primary level, 20 different school factors eled in five or more multivariate analyses, at the second many inputs or teaching practices have been studied in at Second, factors that are more directly manipulable by ce ers and more easily measured through large-scale surv the lion's share of attention, average class size, textbook and use of school libraries, teacher training levels and expe of the instructional programme Third, very little empir curred inside classrooms A few initial studies, drawin survey data, have focused on teachers' own reports of w do within their classrooms. This initial work is beginn between near universal, subject-specific, and culturally s cal practices that help explain variation in achievement l son et al. 1989, Fuller et al., in press; Tatto et al. 1992)

TABLE 1

Explaining Achievement in Developing Countries Effects of Sch Attributes, and Pedagogical Practices[1]

		Number of si *effects*	*Number*
	School/teacher factors[2]	*Primary schools*	
	School spending		
1.	Expenditures per pupil	3	6
2	Total school expenditures	2	5
	Specific school inputs		
3	Average class size	9	26
4.	School size (enrollment)	7	8
5.	Teaching tools		
	Textbooks	19	26
	Supplementary readers	1	1
	Exercise books	3	3
	Teaching guides	0	1
	Desks	4	7
6.	Instructional media[4]	3	3
7	Quality of facilities	6	8
8	School library[5]	16	18
9	Science laboratories	5	12
10	Child nutrition and feeding	7	8

Teacher attributes					
11	Teacher's length of education				
	Total years of schooling	9	18	5	8
	Earlier measured achievement	1	1	1	1
	Tertiary or teacher college	21	37	8	14
12	In-service teacher training	8	13	3	4
13	Teacher gender (female)[6]	1	2	2	4
14	Teacher subject knowledge or language proficiency	4	4	—	
15	Teacher experience	13	23	1	12
16	Teacher salary level	4	11	2	11
17	Teacher social class	7	10	—	
Classroom pedagogy and organisation					
18	Instructional time[7]	15	17	12	16
19	Active, complex pedagogy	3	8	2	5
	In-class written exercises	0	2	—	
20	Frequent monitoring of pupil performance	3	4	0	1
21	Class preparation time	5	8	1	2
22	Frequency of homework	9	11	2	2
23	Teacher efficacy	1	1	0	1
24	Cooperative-learning task structure	—		3	3
School management					
25	School cluster membership	2	2	—	
26	Independence from central government	—		0	1
27	Principal's staff assessment	3	4	0	1
28	Principal's training level	3	4	1	2
29	School inspection visits	2	3	0	1
30	Tracking or pupil segregation	1	1	—	

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[1] Adapted from Fuller (1987), Lockheed and Hanushek (1988), Verspoor et al (1991), plus studies conducted since 1987 which are listed in the appendix

[2] All schools and teacher factors are expected to have a positive association with pupil achievement levels, except average class size which is hypothesised to hold a negative relationship.

[3] A criterion of $p < 05$ is used for statistical significance Only studies that controlled on students' family background within multivariate or experimental designs are included Models differ in terms of how student background is specified and the number and type of school factors included in specific models

[4] Refers primarily to evaluations of radio-assisted instruction For details, see Lockheed and Hanushek (1988)

[5] These studies have looked at the simple presence of a school library (dichotomous variable), size of holdings, and reported frequency of use

[6] See text for details on the match between female teachers and students, particularly with regard to language achievement

[7] Instructional time includes school-level measures of the length of the academic year or length of the school day, as well as observational findings on time spent on instructional tasks within classrooms

Across the variety of societies and local conditions in which these studies were conducted, rather consistent school effects have emerged in three major areas

Availability of Textbooks and Supplementary Reading Materials

The earliest studies revealed wide variation in the availability of textbooks between and within developing countries and covariation with pupil achievement levels. IEA researchers in the early 1970s relied on surveys given to teachers or students, yielding evidence of textbook effects on science achievement in Chile, India and Iran (Comber & Keves 1973, Purves 1973). Investigators also began to actually observe the number of textbooks available and used by pupils within classrooms (Heyneman 1976; for review, Heyneman & Loxley 1983) The World Bank supported two experiments, introducing varying numbers of textbooks into randomly selected classrooms In the Philippines, maths, science, and Philipino texts were introduced in 52 primary schools at ratios of two pupils per book and one pupil per book. A control group of similar classrooms and children also was selected (a total of 2,295 first- and second-grade students were involved in the experiment). Achievement differences for the treatment groups were 30 to 51 *SD* higher across the three subject areas. This improvement was estimated to be twice the gain that would result by cutting size from 40 to 10 pupils. No significant advantage, after supplying one text per child versus one book for every two children, was observed (Heyneman, Jamison & Montenegro 1984). Less robust effect sizes were found in a similar textbook experiment in Nicaragua (Jamison, Searle, Galda & Heyneman 1981).

Recent work within primary schools continues to find positive achievement effects from textbook supplies and utilisation In the impoverished north-east of Brazil, the availability of textbooks and basic writing materials held effect sizes of one-third to one-half a standard deviation, depending on the grade level and subject (Harbison & Hanushek 1992). The importance of supplementary reading materials and pupil exercise books also emerges from the IEA's recent study of reading achievement in four developing countries. These two inputs, along with the presence and utilisation of school libraries, were significantly related to achievement in Indonesia, Trinidad and Tobago, and Venezuela, but not Hungary (Postlethwaite & Ross 1992) The discrete influence of texts, exercise books, and/or school libraries also has been observed in recent studies in Egypt (Al-Baz, Hassan, Fouad & Farouq 1992), Malaysia (Ching et al 1990), Swaziland (Johnson 1992), Thailand (Raudenbush & Bhumirat 1992), and Zimbabwe (Nyagura & Riddell 1992; Ross & Postlethwaite 1992) No significant effects were found from reading materials, after taking into account pupil background, teacher subject-matter knowledge, and other school factors, in a recent study from

Indonesia (Ross & Postlethwaite 1989)

Research within secondary schools reveals less consistent effects from textbooks Quality, in general, often is higher and more uniform across Third World secondary schools, relative to primary schools This raises the general issue of whether school effects may be less at the secondary level, particularly in educational systems that remain highly selective and allow only a small proportion of youths into junior or senior secondary schools This raises modeling problems as well Where secondary schools are highly selective, variance in pupils' family background can be severely constrained Family background, in reality, may largely explain which students persist through primary school and gain places in secondary school (e g , Riddel 1989) But achievement variation among youths within secondary schools may not covary with family background, since variability in student SES has been institutionally narrowed.

Where baseline levels of textbooks are generally low or highly variable, covariation with achievement has been observed within secondary schools (Heyneman & Jamison 1980, Sembiring & Livingstone 1981) Not surprisingly, when schools are well stocked with texts, covariation with achievement is difficult to observe In these settings, variation in supplemental reading materials and utilisation of school libraries does help to explain variation in achievement levels (e.g. Fuller et al , in press, Glewwe, Jacoby, in press) The frequency and duration of teachers' actual utilisation of textbooks also are influential in some settings (for Thailand, see Lockheed & Longford 1991) Similar findings appear in the Glewee, Grosh, Jacoby and Lockheed (1993) study of Jamaican primary schools Levels of basic inputs were generally sufficient, what made a difference was variability in the rate at which teachers utilised textbooks In addition, Glewwe and collegues found that some teaching practices influential within resource-poor school systems, such as assigning written exercises in class, actually depressed achievement. Baseline input levels and those practices that raise achievement on the frontier may vary dramatically across societies and local settings within.

Teacher Qualities

The general background and pre-service training of teachers rarely help to explain variation in children's achievement in the United States and Europe (Hanushek 1989, Harbison & Hanushek 1992, Murnane 1975) Table 1 reveals a contrasting picture when looking at developing country studies. The influence of teachers' own social class background has not been extensively researched, but the majority of studies reveal significant effects within primary schools Much of this evidence comes from Latin America (Farrell & Schiefelbein 1974, Heyneman & Loxley 1983)

Teachers' own knowledge of the subject matter and their verbal proficiencies have held strong effects on achievement in the few primary school studies that have included these related factors In Brazil, Harbison and Hanushek (1992) gave identical maths and Portuguese exams to students and their teachers For maths, a 12 percent higher maths score for teachers was associated with a 10 per cent higher pupil score. The influence of teacher knowledge on children's Portuguese achievement was similar, although of a lower magnitude. Similarly strong effects from teachers' written language proficiency were observed in Indonesia (Ross & Postlethwaite 1989)

Findings are mixed on the influence of teacher's formal education and post-secondary training. Pre-service training does appear to be effective in countries with low or highly vairable teacher quality In these situations, teacher training often is occurring after junior secondary school (9th or 10th grade) Teacher training has recently been associated with primary school student achievement in rural Colombian schools (Psacharopoulos, Rojas, & Velez 1992) and in Zimbabwe (Nyagura & Riddell 1992; Ross & Postlethwaite 1992) In Sri Lanka, Tatto et al. (1992) found associations between training within particular types of pre-service colleges and the performance of their new graduates' own pupils. Importantly, the pre-service training effect in Brazil was eclipsed by the more specific influence of teachers' subject-matter knowledge Similarly, Mullens (1993) found in Belize that teachers' assessed subject knowledge substituted for training levels, with the former representing a more proximate cause of pupil achievement Pre-service training in specialised colleges is expensive and at times not related to student achievement (Lockheed, Verspoors et al. 1991). In Pakistan, while teachers' own levels of secondary schooling was related to their pupils' achievement, the amount of tertiary pre-service training held no effect (Warwick & Reimer 1992). Training levels have been found to hold no effect in other recent studies. in Egypt (Al-Baz et al 1992) and in Thailand (Raudenbush, Eamsukkawat, Di-ibor, Kamali, & Taoklam 1992).

Within secondary schools, one might argue that covariation between teacher training and pupil achievement may be less, given higher and less variable levels of teacher preparation. Yet several studies have shown effects from teachers' total years of schooling, and specifically from their post-secondary training Again, these effects are likely conditioned by the level of variability in secondary school quality. Teacher training levels were found to covary with achievement in Brazil (Lockheed & Burns 1990), the Philippines (Lockheed & Zhao 1993), Thailand (Jimenez, Lockheed & Watanawaha 1988, Lockheed & Longford 1991), and Zimbabwe (Riddell & Nyagura

1991)—all countries where secondary school quality varies significantly[9] The precise mechanisms through which teacher training influences pupil achievement remain unspecified. Chapman and Snyder (1992), in their observation study of Botswana classrooms, found that better trained teachers asked fewer open-ended questions, yet they utilised more instructional tools and provided feedback to pupils more frequently about their comprehension and performance Also in Botswana, in-service training for junior secondary maths teachers helped to explain growth in pupils' maths proficiency over 1 school year (Fuller et al., in press). Pre-service training aimed at preparing more professional subject specialists may yield significant effects, as suggested by Zhang's (1993) analysis of secondary pupil achievement in maths.

The achievement effects of in-service teacher training, in general, are quite mixed This area has received much less attention from researchers, particularly within secondary schools. In-service training may be effective when it interacts with prior levels of teacher education or training Harbison and Hanushek (1922), for example, report positive yet inconsistent effects for an in-service programme serving teachers in Brazil with at least 8 years of prior schooling A similar programme serving less educated teachers held to discernible effect. An evaluation of in-service training in Haiti showed an initial effect on achievement, but one that diminished over time for teachers who had not recently participated (Haitian Foundation for Private Education 1991). In rural Thai primary schools, Raudenbush et al. (1992) compared the relative influence of pre-service, in-service, and instructional supervision by school principals on pupils' achievement level In-service training held no effect. Both the frequency of principal supervision and pre-service teacher training exerted a significant influence, each with an effect size of about one-fifth of a *SD* The achievement effect of principal supervision operated through *instructional quality,* defined by more active teaching methods, more frequent teacher assignment of tasks to pupils, and frequency of feedback to pupils. On instructional mechanisms from the Philippines, Lockheed, Fonacier, and Bianchi (1988) found that the use of science labs covaried with student achievement and the frequency with which teachers utilised the labs was related to in-service training.

In-service training for secondary school teachers has been studied within just four investigations. Work in Thailand revealed that in-service training was related to student achievement in private, but not public, junior secondary schools (Jimenez, Lockheed & Wattanawaha 1988). In Botswana, in-service training in mathematics, although infrequent and not costly, yielded a significant effect on pupil achievement, equaling 40 of a *SD* Similar to the direction of research in the United States, much more work remains to be done on the types of in-service training and school conditions under which sustained effects are observed (e g , Anderson & Djall 1989; Joyce & Showers 1983).

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[9] The effect in Brazil was observed for pupils' maths achievement but not for their Portuguese performance Similarly, the Thai effect pertains to teachers who were specifically trained in mathematics The effct in the Philippines was for teachers who studied science at the post-secondary level

Instructional Time and Work Demands Placed on Students

In the United States, the influence of instructional time on achievement has been the subject of much debate. For young children, the length of academic programmes appears to exert a considerable influence (Brown & Saks 1986). Within secondary schools, typical North American Students actually learn very little (academically) over the school year ("Achievement" 1985). Within European secondary schools, the time spent on specific curricular topics (opportunity to learn) is more directly related to achievement than are gross measures of instructional time (Schaub & Baker 1991; Westbury 1989). And lengthening the school day or school year does not guarantee that the share of classroom time focused on instructional tasks will rise (Karweit 1985).

In contrast, Table 1 shows that even gross indicators of instructional time, across a variety of developing countries, are consistently related to achievement. The early IEA studies revealed consistent effects from the length of the school day and year (for review, Heyneman & Loxley 1983) More recent work, even in secondary schools, shows positive effects. Private secondary schools in five Third World countries, for example, tend to differ markedly from government schools in the number of school days on which students attend, and this helps to explain achievement advantages in the former (Jimenez & Lockheed 1993). In Nigeria, the gross amount of instructional time across schools helped to explain achievement levels (Lockheed & Komenan 1989). Where longitudinal data allow assessment of learning growth within grade levels and across consecutive grades, time in school also holds stronger effects than the limited growth observed within the United States. In Botswana, pre- and post-tests were administered to students in Form 1 and Form 2 Achievement gains during the school year equalled 55 *SD* for English and .45 *SD* for maths. Similar differences were observed between Form 2 and Form 1 students (with very little pupil attrition between grade levels, and thus cohort biases; Fuller et al., in press) Anderson et al. (1989) argue that time in school may be more efficiently used in some developing countries than within industrialised societies, because student misbehaviour and time off academic tasks occur less frequently, at least based on their classroom studies in Nigeria, South Korea, and Thailand (for review of instructional time issues, see Anderson 1991)

Table 1 also reveals inconsistent or lack of effects from other policy-relevant school factors

Class Size

School effects surveys commonly collect information on pupil : teacher ratios and average class size. Recent studies continue to confirm the lack of achievement advantages from small classes. The cost of realising significant achievement gains is usually prohibitive. In north-east Brazil, lowering the average class size by 10 children (current mean equaled 25-30 pupils) would raise fourth grade performance by just one point on Harbison and Hanushek's (1992) 200-item exam. Reductions in the pupil · teacher ratio may yield stronger effects in the poorest countries and/or for certain grade levels. In Malawi or Namibia, for example, class sizes in the first two grade levels often exceed 60 children (Fuller 1991) Within secondary schools, where class sizes are generally smaller, only 2 of 21 analyses have revealed a significant effect on achievement. This absence of any relationship has been observed in secondary schools in a variety of settings. Botswana, the Philippines, and Thailand. Jimenez and Cox (1989) investigated the possible influence of specific ranges of class size, finding no relationship in Colombia and higher achievement in larger classes in Tanzanian secondary school.[10]

Teacher Salaries

Very few studies have found any independent influence of salary levels on student achievement. In some countries, salary levels are co-linear with teachers' age and length of experience, given the emphasis placed on seniority in determining salary rates. Here, alternative model specifications need to be studied carefully. In rapidly expanding educational systems, including the secondary-school subsector, younger and lower paid teachers often are better trained Yet, even in these cases, such as Botswana (Fuller et al , in press), the truly exogenous salary variable is rarely related to pupil achievement. In Brazil, teacher training levels were related to achievement, but salary levels were not (Lockheed & Bruns 1990) Links between salary incentives and achievement may differ in private secondary schools In Tanzania, Jimenez and Cox (1980) found that teacher salaries were positively related to achievement in private, but not government, schools. In general, salaries tend to be lower in private secondary schools while achievement is higher (see evidence from Colombia, Dominican Republic, Tanzania, and Thailand, Jimenez & Lockheed 1993)

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[10] This positive relationship may result from inadequate controls on family background Achievement may simply be higher in urban (and rural) areas where family demand for schooling is stronger and government is unable to provide more teachers and classrooms (for the case of Ethiopia, sea Abraha et al. 1991).

Active Pedagogy and Classroom Processes

Very few Third World researchers have studied teaching practices. Recently, however, several analyses have been completed on the influence of more active or complex forms of pedagogy—that is, taken-for-granted attributes of "good pedagogy" within the North American teacher effectiveness literature (Anderson 1991, Waxman & Walberg 1991) Results from developing countries to date have been quite mixed In Nigerian and Swazi secondary schools, time students spent listening to the teacher lecture was positively related to achievement (Lockheed & Komenan 1989). A second study in Nigeria, with less adequate controls on student background, found that more frequent probes and questions posed by teachers were positively associated with maths achievement (Chacko 1989) Less didactic, more active forms of pedagogy were negatively related to science and maths achievement in the Philippines (Lockheed & Zhao 1993) The influence of pedagogical practices may depend on what particular subject is being taught. In Botswana, for instance, the number of open-ended questions asked by teachers was negatively related to maths achievement but not to English performance (Fuller et al., in press). Use of cooperative student groups has shown positive achievement effects in three studies: This evidence pertains to a controlled experiment in Israeli secondary schools (Sharan & Shachar 1986), to the use of cooperative groups in Filipino primary school science labs (Lockheed et al. 1988, and in China for match achievement (Zhang 1993) The latter study stems from an initial analysis of 120 junior secondary schools, where cooperative groups have long been used to help equalise performance levels.

Scarce Cost-effectiveness Findings

These now plentiful school effects findings help to distinguish factors that are more consistently related to higher achievement from those that are not. But, among the former set of school factors, we know very little about their relative cost-effectiveness. Earlier reviews have rather consistently shown, within developing countries, that lowering class size is not a cost-effective strategy for raising achievement, while the provision of more textbooks and use of interactive radio instruction in classrooms (at least in the short run and under controlled conditions) are quite cost-effective interventions (Lockheed & Hanushek 1988) More recent work on alternative forms of teacher training demonstrates that the cost of requiring more years of pre-service teacher training—say, relative to additional years of secondary schooling for new teacher trainees—can be very costly and yield scant returns in terms of higher pupil achievement (Lockheed, Verspoor et al 1991).

We located just three additional cost-effectiveness analyses that have been completed since this limited literature was last reviewed (by Lockheed & Hanushek 1988) An extensive and innovative analysis has been completed by Harbison and Hanushek (1992) within Brazilian primary schools They first estimated achievement gains associated with each additional dollar invested in school infrastructure of "hardware" (classroom, desks, facilities improvements), "software" (textbooks, writing materials), and pre- or in-service teacher training options. Relative achievement effects were disaggregated for second- and fourth-grade pupils, between achievement in maths and Portuguese, and among the 3 years in which cross-sectional student samples were drawn. Software elements were most consistently related to higher achievement For example, spending an additional U S. $1.00 per pupil on a mix of basic instructional material was related to a 1-2 point gain in student achievement test scores, depending on the subject area and the particular sample cohort Marginal effects of additional hardware were lower, particularly the purchase of more school furniture.

Because students achieving at higher levels were being promoted through the grade levels at a quicker pace, Harbison and Hanushek went on to estimate the net cost savings associated with these alternative interventions, given that more normal promotion rates open up additional places for new cohorts of children. Mean estimate of the cost savings associated with a U.S. $1 00 investment in additional software (via higher promotion rates) equaled almost U S. $7.00 in the second grade and U S $4.00 in the fourth grade In-service training for more highly schooled teachers also yielded high cost-effective benefits. A sensitivity analysis was then conducted to more conservatively estimate these returns, indicating that the effects were more robust in the earlier grade level, grade 2

Cost-effectiveness findings may be dissimilar under differing conditions. Fuller et al.'s (in press) cost-effectiveness analysis based on achievement in Botswana's junior secondary schools, for example, also found that reductions in class size would be enormously expensive and yield slight gains in student achievement Departing from earlier work conducted in primary schools, however, they found that additional investment in basic instructional materials (textbooks, desks, exercise books) would not be likely to yield gains in pupil performance. This is probably due to the fact that sufficient supplies of these materials were observed in classrooms, quite unlike the situation in the impoverished north-east of Brazil. On the other hand, the presence of supplementary reading materials in classrooms was associated with higher achievement, and the cost-effectiveness of these materials was quite high. The per school cost of raising mean achievement by the equivalent of one grade level via additional supplementary readers for all classes was estimated at U S $727. To realise this same level of achievement gain, 14 times this amount would be required if the chosen strategy was to lower class size. Equally competitive in terms of cost-efectiveness, in-service teacher training for maths teachers also appeared to lead to achievement gains, but no significant effect on pupil performance in English was detected

Finally, Murphy (1993) recently compared the relative cost-effectiveness of two types of secondary school training in Malawi regular day schools, often involving student boarding facilities versus a long-standing distance education programme. Murphy reports exhaustively on the cost elements associated with each type of programmes, finding that the government spends almost five times more on day secondary school pupils, compared to distance-education students The average teacher in a regular secondary school earns three times more than the study centre teacher, who supplements, in a classroom, correspondence materials and radio broadcasts. Given the lower proportion of distance-education pupils who pass the junior secondary exam, the relative effectiveness of the programme (ignoring relative costs) is somewhat less than conventional secondary schools However, it costs the government three times more to produce one junior-certificate graduate in day schools, relative to the cost of each graduate coming from the distance-education programme

These types of cost-effectiveness analyses can certainly help to refine the forms of policy advice provided to government decision-makers And consistent cost-effectiveness findings across varied settings—such as the costly and ill-advised strategy of lowering class size—do hold a significant level of generalisability. The scarcity of cost-effectiveness studies remains disappointing, and it constrains the capacity to compare findings across differing situations Levin (1991) emphasises three major obstacles that stunt development of this field. First, too few people are available to conduct sound cost-effectiveness studies. In developing countries, it takes considerable energy and commitment to even conduct a large-scale school effectiveness study. Going the next step to properly calculate alternative inputs and analyse relative effects takes another increment of resources and expertise. Second, data requirements are great to properly calculate various school inputs Third, procedures for modeling achievement effects and then assigning costs to effective factors usually differ across studies—even when the same intervention is being studied When the number of variables (and how they are measured) varies within an estimation model, coefficients and effect sizes will differ. Then, if costs of these school factors are calculated differently by different investigators, the estimated achievement returns associated with similar school factors will be quite different. Levin's suggestions for employing more uniform procedures in carrying out cost-effectiveness studies should be seriously considered

Departing from Western Conceptions of School Effectiveness?

In the United States, crafting an efficacious role for central policy-makers has proven to be quite problematic. Hot debate persists over the equity of school finance schemes, teacher salary levels, and class size—even though none of these inputs is consistently related to higher achievement (Hanushek 1989) [11] How North American educators and scholars define school effectiveness has largely shifted to microschool factors and classroom-level processes In many developing countries, however, central policies hold a greater potential in actually touching the quality of instruction and the achievement of students The basic availability of textbooks and reading materials, the quality of teacher preparation and selection, and even blunt ways of lengthening instructional time (as summarised in Table 1) are all empirically related to higher achievement levels Yet the influence of these policy-manipulable inputs will likely diminish as overall school quality rises, a process clearly seen in much of east Asia and urban areas of Latin America (Fuller 1987; Raudenbush, Bhumirat & Kamali 1989). The production-function line of research may continue to provide useful policy guidance to the poorest nations and to impoverished areas of so-called middle-income countries But in the absence of significant adjustments to their traditional priorities and assumptions, the work of policy mechanics will hold utility within a shrinking number of policy circles.

SPECIFYING LOCAL CONDITIONS FOR SCHOOL EFFECTS: THE END OF PRODUCTION FUNCTIONS?

As the policy mechanics continue to accumulate evidence, two especially troubling weaknesses are becoming more salient. First, only modest progress has occurred in specifying the conditions under which certain school factors are more likely to influence pupil achievement. For example, earlier reviews have argued that the school's aggregate effect, vis-a-vis family background, tends to be greater in more impoverished regions or communities School effects also tend to be stronger for maths and science achievement, knowledge which is more foreign to indigenous communities, than for language learning (Fuller & Heyneman 1989) Mentioned above, effect sizes for basic inputs (like textbooks) also tend to be larger when the base line level is lower, as mean levels of inputs rise, marginal effects decline But beyond these general patterns, researchers have spent energy in specifying scope conditions for their findings.

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[11] More complex models are worthy of further investigation in the United States For instance, Murnane et al, (1991) show that using teacher salaries in the U S have helped to attract and retain better qualified teachers The remaining empirical issue, of course, is whether this stronger preparation is manifest in pedagogical practices that boost student achievement

Second, little work has occurred that looks at how basic inputs are mobilised within classrooms. Initial Third World studies of classroom practices, a line of research running a decade behind work in the West, have yielded mixed results Once teaching practices are set within the classroom culture of a particular country, not within the reified classroom described by U S. researchers, pedagogical methods may be more consistently related to achievement This is essential if one is to describe the mechanisms and social processes through which basic instructional tools actually influence children's learning

We argue that simply accumulating more evidence from production-function studies—without specifying local conditions and without linking input to teaching practices—is becoming a less useful exercise. In countries providing a reasonable level of basic materials, including much of east Asia, Latin America, the Middle East, and eatern Europe, additional production-function studies will hold limited utility. Two exceptions are notable: Work in the poorest regions of these societies (including the U S.) could help guide basic school investments, and school effects research in secondary schools lags far behind primary school investigations Overall, however, the patterns described in Table 1 are very close to those observed in Fuller's (1987) earlier review of 68 multivariate analyses For the present article, we found 37 additional studies that have been completed since the earlier review. This recent work, by and large, replicates the patterns observed 6 years ago

Specifying Conditions for School Effects: The Rules and Culture of Classrooms and Families

School effects in developing countries, and perhaps within impoverished Western communities, can be conditionised at two levels First, the school institution's aggregate effect on learning, relative to family effects, may stem from two contradictory forces. (a) the local level of family demands for schooling, linked to how parents view the legitimacy and economic utility of the school, and (b) the school organisation's capacity to respond to family demand while offering forms of knowledge that are foreign to the community's indigenous knowledge. The second level of conditionality pertains to how achievement effects of specific instructional tools (inputs) and teaching practices are conditioned on (c) the teacher's capacity and preference for mobilising (variably complex) instructional tools and (d) the degree of consonance between the teacher's pedagogical behaviour and local norms regarding adult authority, didactic instruction, and social participation within the school (which may be further conditioned by teacher and pupil gender) Evidence is beginning to emerge on each of these four types of lcoal conditions.

Family Demand and Overall School Effects

The aggregate influence of schooling in developing countries has probably been overstated due to the underspecification of student background factors, including prior effects of family processes and current effects from labour demands placed on children The greatest weakness here is the lack of social class measures that are culturally relevant to the particular society of community being studied. If imprecise SES indicators from the West are simply imported and error terms contain unmeasured elements of family background that are highly correlated with school quality, achievement effects will be mistakenly attributed to school factors. Evidence from Indonesia, Malawi, Thailand, and Zimbabwe shows that, when multiple situationally relevant indicators of class and ethnicity are utilised, the remaining proportion of achievement variance that can possibly be related to school factors diminishes (Lockheed et al 1989, Ross & Postlethwaite, 1992). In Indonesia, Ross and Postlethwaite included 11 modern possessions and 10 types of livestock to validly discriminate families' levels of wealth and social class; together, over half of the total variance explained was attributable to these factors, for achievement in Bahasa, maths, and science. Ethnic membership also may play a stronger role in shaping school performance than material affluence or poverty *per se*, as evidenced by studies in Malaysia (Ching et al. 1990) and Ethiopia (Abraha et al 1991).

We also know that family practices related to later school achievement vary within social classes Much of this empirical work comes from the United States and other industrialised countries (for reviews, Astone & McLanahan 1991, Hess & Holloway 1984) After controlling on surface-level indicators of family SES in Japan and the U S , Holloway et al (1990) show how the perceived legitimacy and importance of the school institution held by parents and their parenting practices in the home strongly predict school performance in children's first 5 years of schooling. Work in southern Africa also reveals how material facets of class are certainly one source of family demand for schooling. But within low-income communities, parents vary significantly in the labour demands they place on their children, their commitment to literacy, the presence of reading materials at home, and their willingness to engage in modern child health and nutritional practice—all factors empirically linked to school demand, time in school, and achievement (Fuller, Singer & Keiley 1993). Recent work in Uruguay also shows how family practices can vary among poor urban households and covary with later school achievement (Comision 1991) In Colombia, Psacharopoulos et al (1992) report how the amount of TV viewing at home is negatively related to school achievement

The consistent influence of instructional time also should push researchers to re-think how family demand for schooling interacts with specific school factors to shape achievement In Ghana, for instance, Glewwe and Jacoby (in press) first investigated which family characteristics and school factors helped to explain when children started junior-secondary school (age at entry), which school they chose to attend (the most proximate or another school via fostering out), and their attainment level After modelling their selection of school, the same school factors were utilised to estimate children's achievement levels Years of school attainment—and thus aggregate time in school—were sharply influenced by child and family attributes, particularly the pupil's gender and whether he or she came from a Muslim family or from the inland savannah region Elements of the school also helped to explain children's attainment distance to school, quality of facilities, presence of basic instructional tools (e.g., a chalkboard), and an experienced teacher. Such school characteristics likely signal to parents whether this is a serious school which offers some utility. In the next stage of the analysis, Glewwe and Jacoby found that time in school influenced achievement in both maths and reading This kind of study illustrates how the school's aggregate effect is conditioned by deeper levels of family demand for schooling within a particular local context

Family demand for more shooling is patterned by youths' gender and age in many developing countries The recent IEA study of reading achievement in 32 countries helped to illuminate a disturbing irony. In eight of the nine developing countries included, girls (at age 14) outperformed boys in reading achievement; yet their attainment in the later grades of secondary school begins to lag behind that of boys in many cases (Elley 1992) [12] Young females often feel the pressure of labour demands and social expectations regarding childbearing and marriage earlier than do young males These forces probably influence the regularity of their school attendance and thus the aggregate amount of instructional time received

Family demand for schooling also is shaped by ethnicity in many societies, at times independently of material aspects of social class In Ethiopia, Oromo children tend to outperform other pupils, even though their families hve been historically subordinate to other groups (Abraha et al 1991). In Zaire, Sheline, Pagagiannis, and Grant (1984) found the secondary school performance was strongly explained by the demands of Baluba parents to find spaces in high-status Catholic boarding (secondary) schools. And ethnic membership continues to exert a strong influence on school achievement in Malaysia (Ching et al 1990) If researchers more carefully studied the influence of ethnicity on family demand and parenting practices prior to and concurrent with children's school attendance, they would more completely condition the value-added effect of school factors.

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[12] Developing countries include Botswana, East Germany, Hungary, Nigeria, Philippines, Thailand, Trinidad and Tobago, Venezuela, and Zimbabwe

Effective Schools Transmit Foreign Knowledge

Intuitively, one might feel that the aggregate effect of schools would be greater when they respond to family demand by converging with indigenous forms of knowledge But, of course, the central state usually has an agenda that emphasises modern forms of secular knowledge. a lingua franca that may be held by a minority of the population, and maths and science knowledge that holds some economic utility and a great deal of status under modern rules (Benavot, Cha, Kamens, Meyer & Wong 1991) Indeed, when the school positions its curricula apart from the family, the school's effect can operate more independently of parental influences This relative positioning of school and family represents the second major institutional condition under which school effects are more likely to occur. This pertains both to the subject matter being taught and the distribution of school resources vis-a-vis family resources across communities within a society. We address each of these elements in turn.

Inferences about the school's aggregate effect in developing countries have been disproportionately influenced by studies of maths or science achievement Indeed, Heyneman and Loxley's (1983) oft-cited empirical findings from 29 countries showing lower family effects in poorer countries, were based primarily on science achievement The school's relative efficacy in language and reading achievement is usually much less. For instance, early studies found inconsistent or no effects from textbooks or instructional time on reading achievement in urban Brazil (Wolff 1970), Indonesia (Sembiring & Livingstone 1981), Malaysia (Smart 1978), and Tanzania (Psacharopoulos & Loxley 1986). More recently, Harbison and Hanushek (1992) found that teacher's subject-matter knowledge of maths was strongly related to children's maths achievement (mentioned above), but no cross-over effect occurred for Portuguese, and teacher qualities were less consistenly related to Portuguese performance. In Israel, Yair and the Jerusalem Educational Authority (1992) found much greater variability in Hebrew achievement, compared to maths scores, and teacher effects were stronger in explaining variation in maths performance than in language scores Elley (1992) shows how reading achievement in the school's official language suffers when children speak another language at home, a specific condition that affects the school's discrete influence.[13]

The foreign character of school knowledge and written literacy is dramatically illustrated by one study from the very poor country of Malawi, where the supply of textbooks and teacher guides helped to raise teacher's own literacy scores (Fuller & Kapakasa 1991). Subject matter and family practices also can interact, as found in Malaysia where the frequency with which parents read to their child in English held a predictably positive effect on English achievement in school (Ching et al. 1990). In sum, to more carefully study the school's aggregate effect within impoverished settings, researchers must differenciate the subject matter being taught and its relation to indigenous forms of knowledge, as well as family practices and demands that may condition the school's specific influence.

Parallel distributions of school resources and family demands across different communities also may condition school effects. For example, Raudenbush's work in Thailand has been the most sophisticated in showing that effects from specific school inputs and teacher attributes are greatest in the poorest communities and when baseline levels of school resources are low (Raudenbush et al. 1989). The pupil-teacher ratio, quality of school facilities, textbooks and presence of a school library all showed significant effects under these two conditions, diminishing in less poor urban areas (as the school institution becomes less foreign and better stocked with these basic inputs). Lockheed & Komenan (1989) demonstrate how certain teaching practices may have nonlinear effects, such as the diminishing utility of seatwork after a threshold amount of time is spent on this activity.

Teacher Preference for Mobilising Complex Instructional Tools and Social Rules

As empirical work in classrooms expands, a major dialectic between Western policy mechanics and Third World teachers comes into clearer focus. The former would like to show that teaching practices from the West can raise pupil achievement across very different cultural settings. For instance, Anderson (1991, p. 42) puts forward a universal postulate about effective classrooms: "Teachers should develop classrooms in which there is mutual respect between teachers and students and a high degree of cohesiveness among students themselves." Yet qualitative work in Third World classrooms reveals hierarchical forms of teacher authority and infrequent lateral discussion among students (e g , Fuller 1991, Nitsaisook & Anderson 1989, Prophet & Rowell 1993) Not surprisingly then, when teachers display more participatory forms of pedagogy, achievement gains are not always observed. As mentioned above, Lockheed and Komenan (1989) found that time spent by pupils listening to the teacher's lecture was positively related to achievement In Swaziland, seatwork—the dread of teacher effectiveness experts in the West—was positively associated with achievement as well In the Philippines, achievement was lower in classrooms with teachers who reported more active and participatory forms of pedagogy (Lockheed & Zhao 1993). In some subject areas, such as maths, more questions by teachers and broader discussion of material have been found to suppress achievement (Fuller et al , in press) Contradictory signals also may be coming from the policy mechanics In Gambia, one ethnographic study found that teachers appreciated the government's emphasis on supplying more textbooks, but many felt that the texts contained the range of pedagogical practices that were perceived as legitimate (Sarr 1990).

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[13] For the nine developing countries included in the IEA reading study, the percentage of children who did not speak the school language at home ranged from 0.6 per cent in Hungary to 89.6 in the Philippines. For the latter case, children who spoke the school language scored two and one half *SDs* higher on the reading exam. On the other hand, in Thailand and Nigeria where per cent 38.7 and 41.2 per cent, respectively, of all 14-year-olds do not speak the school language at home, insignificant achievement differences were observed (Elley, 1992).

On the other hand, Western forms of "effective teaching" have shown positive effects in some settings. In Malaysia, achievement was higher when students reported that their teacher took greater care to assess their comprehension and when given more opportunities to discuss topics in class (Ching et al 1990). In Sri Lanka, Tatto et al (1992) show that subject-matter knowledge and teacher-centred instruction, when blended with interaction and explanations for pupils, are positively associated with higher achievement

The Cultural Meaning of Pedagogical Behaviours

Observation studies of classroom—in both the United States and the Third world—often reveal key dimensions of the classroom's social rules. (a) norms about the teacher's authority, (b) implicit rules about pupil participation (pertaining to interaction with the teacher and with fellow students), and (c) the structure of classroom work and tasks, including what instructional tools are employed, how task demands are placed on students, and whether work is performed individually or cooperatively (in the U S., Goodlad 1994, Stodolsky 1988; in Japan and China, Stevenson & Stigler 1992; in other Third World countries, Anderson et al 1989; Fuller & Snyder 1991; Prophet & Rowell 1993). A serious weakness of the producton-function line is that instructional tools and even teaching practices are seen as cultureless, technical instruments for raising achievement Efforts have been made to identify the human mechanisms through which inputs are mobilised in the classsroom: Lockheed, Vail, and Fuller's (1986) study in Thailand illustrates how textbooks interact with the teacher's level of training, the amount and structure of instructional time, and levels of homework that flow from greater use of the text Particular social rules that may operate independently of local culture also have been studied, such as the IEA finding that, across eight varied countries, teachers feel very little over the content of what is taught (Bourke 1990) But very little is known about how key inputs, such as texbooks or pupil exercise books, act to mediate implicit cultural rules found within different classrooms An important starting point is to discover the meanings and constructed uses that are attached to pedagogical behaviours and instructional tools —through the eyes of teachers and students.

On teacher authority, we know that many teachers exercise their role by exhibiting expertise and knowledge of facts In southern Africa, for example, Prophet and Rowell (1993)) detail how science teachers take little time to check pupils' comprehension of biological processes (related to plant reproduction or crops). Instead, they keep pressing to be sure that students have memorised the "proper" English vocabulary pertaining to parts of plants. Similarly in rural Colombia, Laserna's (1988) classroom ethnography reveals how teachers almost never take into acccount indigenous arithmetical knowledge held by children, instead didactically present the abstract, reductionist concepts appearing in the textbook

We know very little about how basic instructional tools, like texts or exercise books, reinforce (or subvert) the teacher's conception of authority. It is likely that an insensitive pressure to use novel teaching tools could undermine highly effective forms of authority—for exmple, Chinese teachers' use of competition among cooperative groups within their classrooms (Stevenson & Stigler 1992) If policy mechanics pressed for a more teacher-centred use of texts, or monitoring of individually performed exercises, the intervention might well suppress pupil achievement in the Chinese context. We also know that teachers' conceptions of authority and rules about how classroom work should be organised varies dramatically within multicultural societies. Saad and Hendrix (1993), for example , found that Israeli and Arab teachers differed sharply in their beliefs about how hierarchical and didactic teachers should be in the classroom. This also interacted with the urban or rural location of their schools

The Culturally Constructed Meaning of Classroom Inputs

When governments or development agencies purchase instructional materials, assumptions are made about what learning effects these teaching inputs will yield, and via what process. These presumed causal sequences rely on secular, cultureless conceptions of the meanings assigned to these materials by teachers For example, earliest policy mechanics (including the first author of this article) have conducted country studies which show an association between the supply of pupil exercise books and higher achievement The inference is then made that more exercise books lead to more frequent cognitive exercise and independent work by students, either in class or at home Resulting policy advice Buy and distribute more exercise books

Our research group, however, is currently observing classrooms in the South African township of Soweto, where the majority of teachers simply instruct their students to copy material from the board or from the teacher's recitation into their "exercise book." This same instructional tool is assigned a particular local meaning by Soweto teachers, quite different from its actual meaning and use elsewhere in the southern African region. Unless these local meanings, activated by classroom teachers in a specific institutional culture are taken into account, researchers will fail to understand the process by which classroom "input" influences student learning.

Studies are emerging that focus on how teachers assign variable meanings to the same instructional tools Ethnographers Prophet and Rowell (1993), introduced above, observed how teachers mobilise teaching tools within Botswana's (junior secondary) science classes Despite how texts and teacher guides proclaim the virtues of pupil discovery, Botswana teachers focus on enforcing the use of English terms and vocabulary rather than being concerned with pupils' knowledge of biological processes Nor do teachers build on what students do understand, instead they rely on sentence-completion questions, even during pupil-performed experiments. Well-intentioned curricular materials are actively interpreted by science teachers, who simply fail to decode the notion of "discover" and lapse back into didactic forms of pedagogy

Rough's (1992) ethnographic work within Pakistani primary schools reveals that teachers are rewarded for covering the curriculum "on time" and seeing that their pupils can provide the correct, memorised responses from their textbooks to questions posed by headmasters The textbook is the key collection of facts around which proper socialisation and achievement are defined. The surface level transmission of knowledge occurs on top of a much deeper process of child socialisation and normative ways of behaving in the school setting, with recall exercises indicating whether the student has been serious and hard working. The textbook becomes a central tool for reinforcing this sacred method of socialisation.

Active construction of what a teaching "input" really means in practice is not restricted to developing countries. Cohen's (1990) observation of one North American mathematics teacher, and her unknowing subversion of California's innovative curriculum framework, is a notable study. This teacher was delighted with how these state-level curricular guidelines, encouraging more inventive teaching practice, had in her own eyes revolutionised her pedagogy. Yet researcher Cohen observed only glimpses of altered teaching methods, instead the maths teacher simply recast called-for innovations into her traditional didactics By simply studying empirical links between this new teaching tool and achievement, researchers would miss the active interpretation of what the tool really means to the teacher

In Israel, Zuzovsky and Aitkin (1991) similarly found that many science teachers followed the spirit of a new curriculum, emphasising inquiry methods of teaching Yet most teachers blended this with traditional didactics, science labs were used much less frequently than anticipated. Uniform expectations were held at the central ministry for this innovative teaching tool, but teachers assigned variable meanings and mobilised this "input" in quite different ways.

A final example of the cultural variability in how meanings become attached to pedagogical practices and tools follows The production-function line has pushed forward discussion on the relative effectiveness of particular types of school organisations. For example, private schools do appear to outperform government schools in certain settings, and all girls schools are sometimes more effective, as are mission schools and quasi-Islamic schools But the next generation of questions relates to why certain forms of school organisation are more effective and why differences in their supplies of material inputs often explain little (Jimenez & Lockheed 1993). We argue that the cross-cultural study of teacher authority, rules of classroom participation, the structure of classroom work— and how teaching tools or inputs mediate these social forces—represent the frontier for understanding underlying differences among school organisations.

Variability in Teachnical Conditions

The limited range of universal school effects observed above can be attributed to two other types of interrelated conditions. Political and organisational conditions that influence the supply or distribution of an input may be such that an achievement effect cannot be observed. For instance, where textbooks are scarce or distribution is skewed, detecting any correlation may not be statistically possible. The reality set by organisational constraints yields input levels that fall short of required thresholds or manifest insufficient variances. Similarly, where the validity of measurement tools is weak—especially in the complex area of classroom observation—achievement effects probably will not be observed. Validating instruments by gleaning what teaching tools and pedagogical behaviours actually mean in the eyes of teachers and students, through interviews and longer term ethnography, would take one quite far in culturally situating which classroom practices likely boost achievement.[14]

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[14] We thank an *RER* reviewer for pushing us to think about the variability of non-cultural factors that condition school effects

The inconsistency of school effects findings also may be due to the fact that some school systems operate so inefficiently that certain teaching tools, which under more optimal organisational conditions would yield achievement gains, fail to be utilised efficaciously. It is like an inexperienced peasant farmer who has all the productive ingredients he or she needs but lacks the organisational know-how to deploy the inputs in productive ways (Hanushek 1986). If one took into account the conditions under which school inputs are well, or poorly, organised, links with school achievement might become more consistent (Finnan & Levin 1993)

The Remaining Utility of Modelling Achievement

Critics of the policy mechanics often confuse the limited range of which factors have been measured with how variation in pupil achievement is modelled. One should not necessarily throw out the method associated with the latter as one broadens and culturally situates the range of tools, classroom rules, and pedagogies one observes. School and classroom ethnographies have contributed much in opening up the field of classroom culture But the classroom culturalists have yet to delineate which forms of teacher authority of social participation are empirically predictive of student achievement. Similarly, if one is to strive for a more balanced focus on cognitive achievement and socialisation, one must necessarily broaden the dependent variables But one can agree on these outcomes and then back up and identify which specific elements of classroom culture are empirically associated with achievement and normative socialisation.

Similarly, how one thinks about human learning is undergoing a reformation, moving from purely developmentalist or behaviourist perspectives to a perspective that emphasises how children construct and assign meanings to "facts,"tasks, and behaviours within particular cultural contexts (e g., LeVine et al. 1991; Rogoff 1990, Wertsch 1991) Here cognitive knowledge and achievement blend with the normative rules and meanings that children learn implicitly (socialisation). Instructional tools and tasks mediate this learning, both in school and out of school with teachers, parents, and other adult mentors The classroom culturalists have advanced researchers' understanding of how motivated learning occurs within particular social contexts, like classrooms. The production-function gurus continue to hold comparative advantage in empirically linking classroom tools to achievement. But this advantage will only be retained if these inputs and teaching practices are awarded real cultural meanings—within a pariticular context which is energised by variable forms of teacher authority, social participation, and classroom tasks.

Conclusions: Teachers and Tools in Local School Cultures

The policy mechanics have contributed much to researchers' understanding of the school institution's effectiveness across diverse cultural settings It is no longer assumed that the family's influence eclipses the school's impact under all conditions Much empirical evidence has been accumulated on which certain policy-manipulable inputs—instructional time, texts and reading materials, and certain forms of teacher education—will probably make a difference within impoverished communities. And researchers have become more sensitive to empirical evidence regarding the relative magnitude of achievement effects of alternative school inputs, as well as to the cost at which these effects will likely be observed

Equally important, researchers are realising how teaching practices and classrooms differ across societies and local communities. In the Unites States, only a few researchers have been sensitive to variability inside classrooms—variation linked to the community's cultural norms or to how teachers construct different socialisation experiences based on students' ethnic or social class characteristics (Carew & Lightfoot 1979, Everhart 1983) Cross-cultural variability, in contrast, has received more serious attention by classroom observers overseas A few researchers working from production-function roots have begun to empirically relate this cultural variation in teaching practices to student achievement.

We delineated above the types of local attributes that may condition these effects from inputs and classroom practices· the intensity of families' demand for schooling, the school's aggregate influence on learning vis-a-vis contextual forces; the foreign or indigenous character of knowledge being instructed inside classrooms, the level (and forms) of complexity traditionally demanded of teachers inside their classrooms, the meanings of different pedagogical behaviours from the viewpoints of teachers and children, and, similarly, how basic teaching tools are assigned culturally variable meanings. We also noted other types of local conditions that are not cultural in nature but also must be taken into account: whether input levels have reached necessary thresholds before effects can be observed; whether inputs and teaching practices are distributed with reasonable proximity to normality; and whether measures and instruments have been validated within local contexts. Conducting school-effectiveness studies which are sensitive to, and attempt to measure, variability in local conditions will require more resources and broader technical competence in study teams, not the least of which is deeper local knowledge.

Small steps have been taken, in designing and implementing research programmes, to take local conditions into account This research remains largely bounded by the Western conception of (teacher-centred) pedagogical practice and by implicit social rules pertaining to authority and social participation But it does shift attention to how policy-manipulable inputs are actually mobilised by teachers More fundamentaly, the marginal effect of dropping more inputs into classrooms or lengthening instructional time will surely diminish as basic quality levels rise Simple adjustments to the production-fuction framework may not be sufficient to further illuminate effective policy measures. The next generation of questions pertains to how these tools are culturally situated and understood in the eyes of teachers and pupils, including how these tools help to structure the coassroom's social rules.

Closely following is another challenging issue Are these inputs and teaching practices reproducing the forms of learning and socialisation that are truly desired by educational leaders or local communities? Researchers may be simply raising the efficiency with which governments push an excessively narrow form of learning and socialisation—especially in newly democratic societies that are struggling with how to broaden their conception of school achievement

Appendix
Developing-Country School Effectiveness Studies, 1987-1993

Study	*Country*	*School inputs, teacher attributes, pedagogical practices assessed*[1]
1	2	3
Primary school studies		
Al-Baz et al (1992)	Egypt	Lecture time, rewards for positive pupil performance, home work, school library, teacher training, salaries, teacher experience, encouraged reading outside of school
Chung et al (1990)	Malaysia	Textbooks, school library utilisation, facilities pedagogy emphasising discussion, use of texbooks in lectures
Eisemon, Schwill, & Prouty (1989)	Burundi	Headmaster supervision, teacher absence, class size School size, language of instruction [2]
Glewwe et al (1993)	Jamaica	School inputs, pupil tests, time in school, classroom activities, and gender effects

1	2	3
Haitian Foundation (1991)	Haiti	Instructional time, teacher preparation, in-service training
Harbison & Hanushek (1992)	Brazil	Textbooks, exercise books facilities, teacher training, subject matter knowledge, multigrade classrooms, salaries, class size.[3]
Johnson (1992)	Swaziland	School library, facilities, instructional time, school size, textbooks, desks, teacher training [4]
Lockheed (1991)	Nigeria	Complex use of teaching materials, class size, teacher gender, testing of pupils
Lockheed, Fonacier, & Bianchi (1988)	Philippines	Class size, school size, teacher training, use of science lab, group work, pupil assessment
Mullens (1993)	Belize	Teacher training and prior achievement of teachers.
Nyagura & Riddell (1992)	Zimbabwe	Textbooks, teacher gender, age, training level, planning time, class size, instructional time, teacher experience
Palafox, Prawda, & Velez (1992)	Mexico	Day shifts, preschool access, attempt to control, on ability
Postlethwaite & Ross (1992)	Hungary,[5] Indonesia, Trinidad-Tobago, Venezuela	Textbooks, school library, supplementary reading materials, class size, homework principal assessment of teachers, teacher experience
Psacharopoulos et al. (1992)	Colombia	Class size, electricity (facilities), teacher training, experience.
Raudenbush & Bhumirat (1989)	Thailand	Class size, school size, textbooks, facilities
Raudenbush et al (1989)	Thailand	Teacher efficacy, effects, after accounting for child nutrition and earlier indentified factors
Raudenbush, Kidchanapanish, & Kang (1991)	Thailand	Effect of preschool access
Raudenbush & Bhumirat (1992)	Thailand	Conditionalised effects from textbooks, exercise books, teacher training, in-service.[6]
Raundenbush et al (1992)	Thailand	Principal supervision of teaching, in-service training, teacher age and experience (with covariates above)
Reimers (1992)	Pakistan	Class size, teacher education, in-service training
Ross & Postlethwaite (1989)	Indonesia	Teacher subject knowledge, instructional time, class size, teacher guides

1	2	3
Ross & Postlethwaite (1992)	Zimbabwe	Textbooks, exercise books, desks, teacher training, length of instructional programme
Tatto et al (1992)	Sri Lanka	Complexity of pedagogy, class size, teacher training, inservice.
Warwick & Reimers	Pakistan	Total years of teacher education post-secondary teacher training
Willms & Chen	Israel	Tracking and between-class segregation on the basis of pupil ethnicity.
Mullens (1993)	Belize	Teacher training and prior achievement of teachers
Glewwe et al (1993)	Jamaica	School inputs, pupil tests, time in school, classroom activities, and gender effects.
Secondary school studies		
Anderson et al	Nigeria	Teaching practices Questions, comprehension checks, probes, lecturing time, teacher training.
Fuller et al (in press)	Botswana	Textbooks, supplementary reading materials, class size, teacher training, complexity of pedagogy, instructional time.
Glewwe & Jacoby (in press)	Ghana	Instructional tools (texts, chalk-board), teacher training, facilities quality, instructional time
Jimenez & Cox (1989)	Colombia, Tanzania	Public and private school comparison class size, teacher salaries (nonlinear effects).
Jimenez & Lockheed (1993)	Colombia, Dominican Republic, Tanzania, Thailand	Public and private school comparison: instructional materials, teacher training, in-service, class size, instructional time, supplementary readers[7]
Jimenez, Lockheed, Luna, & Paqueo (1991)	Dominican Republic	Teacher education and experience, instructional time.
Jimenez, Lockheed, & Wattanawaha (1988)	Thailand	Teacher training, in-service, exercise books, class size, school size, pupil assessment
Keves (1992)	Hungary	Instructional time, homework, class size, active teaching methods
Lee & Lockheed (1990)	Nigeria	Single-sex schools, teacher gender[8]
Lockheed (1991)	South Korea	Single-sex schools, teacher gender, school size, instructional time
Lockheed & Bruns (1990)	Brazil	Public and private school comparison instructional time, class size, teacher training and salary.

1	2	3
Lockheed & Komenan (1989)	Nigeria, Swaziland	Teacher training, class size lecturing, seatwork, teacher monitoring of pupil work
Lockheed & Longford (1991)	Thailand	Teacher qualification in subject (maths), use of textbooks, school size, teacher experience, gender, age, class size [9]
Lockheed & Zhao (1993)	Philippines	Teacher training, class preparation, science labs, complex and active pedagogy.
Riddell (1989)	Zimbabwe	School type (level of instructional resources) and pupil selectivity
Riddell & Nyagura (19910	Zimbabwe	Textbooks, teacher training, stability of school staff, class size, school size
Suriyadi et al. (1981)[10]	Indonesia	Instructional time within different social class groups
Zhang (1993)	China	Teachers specialising in maths, co-operative pupil groups, class size frequency of maths instruction

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[1] School inputs and teaching practices listsed are those on which each article focuses or those predictors that remain in final models reported. Not listed are variables specific as covariates or control variables However, this latter set are included in summary Table 1

[2] Primarily correlational findings, with limited controls on these school's socio-economic context

[3] Also see Armitage et al. (1986) and Hanushek et al (1992)

[4] Findings should be interpreted cautiously, school-level analysis conducted with minimal controls for variation in the school's socioeconomic context

[5] Reading literacy asessment, International Association for the Evaluation of Educational Achievement (IEA).

[6] Where models are similar with final models in Raudenbush and Bhumirat (1989), significant predictors are not reported again in Table 1.

[7] Complete models and detailed findings for Thailand appear in Jimenez, Lockheed,and Wattanawha (1988), for Colombia and Tanzania in Jimenez and Cox (1989)· for Dominican Republic in Jimenez et al (1991).

[8] Details on complete models appear in Lockheed and Komenan (1989)

[9] Also see Lockheed's (1991) summary of the final model

[10] This study, published prior to 1987, is included because it has not been included in earlier reviews

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Qualitative Evaluation of Teaching in Mexican Multigrade Schools

Eduard Weiss and Justa Ezpeleta

THE PROBLEM AND THE EVALUATION

Mexican public school system took form in the second half of last century but was largely limited to urban areas and local towns. After the social revolution of 1910-20, there was a large effort in the twenties and thirties, spurred by central government, to provide access to schools in rural areas, which were considered an important part for national identity building; they also were often the only agency of central government present in rural areas The task of teachers was not limited to teaching, reading, writing and arithmetic—to children and adults—but also to foster civic culture, hygiene, land reform and modern agricultural techniques. From 1950 onwards, in the wake of import substitution politics, the rural schools were incorporated into the dominant urban pattern. In the seventies—after student revolt in 1968 and in the context of Third World politics—a second attempt was made to offer schools to distant and isolated rural communities (Weiss 1982) In the nineties, in the context of neoliberal economics, seeking access to the process of industrial globalisation, a Free Trade Agreement with the U.S A and Canada (1993) and entrance into the OECD (1995), the central Mexican Secretary of Public Education embraced international educational policies, as agreed on by World Bank, UNICEF, UNESCO, other agencies and the national governments in the "Declaration of Education for All" (Jomtien 1990) and detailed for Latin America by the joint study of CEPAL and OREALC/UNESCO (1992): *Educación y conocimiento eja de la transformación productiva con equidad* (See also Tedesco 1993).

Although access to the first grades of education is more or less covered in Mexico, quality and equality of education are amiss On national average only 57 5 per cent of students finish within six years primary school, and only 84.8 per cent finish it at all in 8 or more years. In poor rural states like Guerrero and Chiapas 19.1 per cent and 27 3 per cent of persons between ages 6 and 14 do not assist to now obligatory basic education of ten years, in populations of less than 100 inhabitants the respective percentages are 42.9 per cent and 48 7 per cent (SEP 1996) In these states the grade of schooling of population of 15 or more years of age was 5.3 and 4 1 years respectively in 1993, compared to 6 6 years nation-wide (SEP 1994). School system and its statistics do not take notice of the difference in organisation between schools with one teacher per grade and multigrade teaching situations, although on a national level around 40 per cent of schools, that attend an estimated 10 per cent of primary students, have multigrade teaching. As one of my colleagues (Schmelkes 1994, 34) says, inequality does not only consist in reproduction of economic, social and cultural inequalities by the school system, but first of all by offering unequal inputs—in terms of quantity and quality—to poor regions and populations Throughout Latin America, compensatory programmes are trying to overcome these inequalities and at the same time to modernise the school systems

In Mexico, PARE (Programa para Abatir el Rezago Educativo—Programme for the Reduction of the Educational Lag) involves an amount of US $ 312 million, financed with US $ 250 million by the World Bank and US $ 102 million by federal Mexican government The total is equivalent to 10 per cent of current costs and investment in primary schools in those four states in four years prior to project implementation. The project was designed to reduce poverty and inequality of primary education in rural areas of the four educationally most neglected states of Mexico: Chiapas, Guerrero, Hidalgo and Oaxaca The project was implemented in 1992 and will be concluded in 1996 (Banco Mundial 1991; CONAFE 1994)

PARE aims to improve primary enrolment, retention, completion rate and learning achievements through implementation of four broad categories of activities: (a) human resource development, involving training of all relevant education personnel at field, state, and central level, focusing especially on in-service teacher training, (b) human resource incentives, mainly in form of an extra-salary to teachers working in distant communities, (c) materials development and distribution, ranging from school construction and equipment to improvement of distribution of free national textbooks, distribution of books for the reading corner and other teaching and learning materials, and (d) development of administrative and managerial capacity, including systems to monitor and evaluate project progress. PARE is operated by CONAFE (Consejo Nacional de Fomento Educativo), a semi-autonomous agency of Federal Secretary of Education, founded in the seventies to design and implement innovational programmes for marginal populations

Evaluation, originally planned by World Bank and CONAFE, was restricted to a cost-benefit analysis of project impact However a sister institution (the Centro de Estudios Educativos, specialised in this type of research), invited us (the Department of Educational Research of CINVESTAV) to present a joint evaluation proposal, which included a qualitative part, based on our speciality: ethnography (see Rockwell and Ezpeleta 1984, Ezpeleta 1991, 1992; Rockwell et al. 1991, Rockwell and Mercado 1989; Weiss 1993) and special didactics (Block 1987, 1996; Candela 1991, Ferreiro and Teberosky 1982; Ferreiro 1994, Ferreiro and Rodriguez 1994; Fuenlabrada 1981; Fuenlabrada, Block, Balbuena, Carvajal 1991).

Our approach to evaluation (Ezpeleta, J. and E Weiss et al 1994) sought to understand the impact of innovation from understanding the local workings of schools and classroom practices, in order to point out obstacles to be overcome in the process of project implementation.

METHODOLOGY

The qualitative evaluation study was conducted through two schools years (1992-93 and 1993-94) according to ethnographic procedures in 13 cases of schools and their surrounding communities in two states: Guerrero and Oaxaca. The first year we selected 6 multigrade schools and 3 full-fledged schools in comparison, out of these 9 schools three were bilingual indigenous schools. The second year we changed sites of the 4 general primary multigrade schools and maintained the rest of the sample.

TABLE 1

Selection of Research Sites

1st year	*General primaries*			*Bilingual primaries*			*Total*
	Oaxaca	*Guerrero*	*Subto*	*Oaxaca*	*Guerrero*	*Subto*	
1 teacher/grade	1	1	2	0	1	1	3
Multigrade	2	2	4	1	1	2	6
Total 1st year	3	3	6	1	2	3	9

Field research was conducted by two research teams, each composed by two persons (one male, the other female), trained in ethnographic procedures, which visited each school and community twice a year during one week. They did 205 interviews with local authorities (35), parents (65), children (36), teachers (36), supervisors and technical personnel (23) as taped and semi-structured or untaped and unstructured interviews aided by field notes They also made 62 unstructured classroom observations and 6 observations of courses of in-service teacher training, aided by field notes and tape transcription

Analysis of "school organisation and their environment" was based on categories stemming from ethnography and sociology of schools, as well as recent education policy discussion. Analysis of "classroom processes" combined categories stemming from ethnography of teaching, general didactics and didactics of mathematics, language and science learning The ethnographic approach helped to avoid classical evaluation studies which contrast existing classroom practices with pedagogical models, without understanding the specific situation; it also helped to tie in teaching practices with school practices and working conditions. On the other hand classical didactic categories, like "sequence of teaching units", "forms of teaching or "translation of content" helped to structure results of "organisations of teaching " Categories stemming from special didactics of language, mathematics and science learning helped to understand the poor relation between prevailing methods and expected competencies. (See my paper, Weiss 1996, on *The dialogue between different approaches, ethnography, cognoscitivism and didactics.)*

The analysis I present here excludes bilingual, indigenous teaching for various reasons: (a) we only visited three bilingual schools without speaking the language; (b) bilingual education is a specific and intricate problem; (c) bilingual, indigenous schools share, on the other hand, the problems of general multigrade schools in rural areas.

CONTEXT

Communities

Our ten villages with multigrade schools are located in mountain regions and have 150 to 400 inhabitants. Access is difficult, the last stretch from a dirt-road to the community is always by mules or on foot and takes half an hour to three hours. People live on rain-season agriculture, most soils are eroded by land splitting and over-exploitation and require fertilisers to achieve any substantial harvest. In order to buy inputs they have to migrate, the young men work at construction sites and the young women at domestic services in state capitals, and also in Mexico City. In some communities whole families emigrate for the harvesting season to agricultural camps within the state (coffee) or to northern Mexico (tomato) There are also various degrees of permanent emigration, even to the United States, which has different effects on the village of origin· some are frankly in decay, leaving only elder people and grandchildren, others are strengthening their communal resources—village feasts and system of charges—by financial inputs from the migrants.

Most villagers are interested in educating their children, because they know by market contacts with the outside and by migration the importance of speaking Spanish, of literacy and arithmetic In each village, however, there are some 10 to 30 per cent of families that require permanent infant work for survival, the rest tries to send them to school on a more or less regular basis School entrance is not always at the age of six, as some families regulate entrance of their children

All of the communities had helped to get and build the school and to maintain it. Big decisions are made in general assemblies of parents or the village Normally there is one man in-charge of attending on-going needs of the school and maintaining linkage with the teacher(s), his authority is either linked to the parental organisation the school system promotes and/or to the traditional structure of "charges" in the community.

Schools and Teachers

Teachers are mostly male below 30 years of age, and are sons of peasants who come from other villages of the same state or another state. Mexican school system normally does not assign teachers within their own community of origin In spite of their rural origin, their contacts with villagers are limited. Most of them live in a nearby larger village or town ("cabecera municipal") and travel either daily to school or live in the community only from Tuesday to Thursday Half of them has a family to support and many do other work: from helping their parents in agriculture or working in their own plot, through being rural musicians, to working in local transport or commerce. Most teachers have completed their "normal school," some on high-school level, others on the level of higher education (since 1984), many have done their studies in weekend courses Some, especially in indigenous education had only three months of pre-service training, others are still studying semi-distance courses offered by the National Pedagogical University In general their reading and writing habits and academic skills and interests are low.

The teaching "career," in practice, places newcomers (to the school system in general or to the specific district) and teachers, who committed faults or are troublesome to supervisors, in the most distant schools From there on they work their way to larger communities and schools closer to their old or new home or to the state capital. They can also rise to the position of director of school or supervisor. Teachers receive a salary which oscillates according to exchange rates and inflation between US $ 250 to US $ 500 a month, payable every two weeks.

Multigrade schools count with one, two or three teachers for six grades. However school-system—till now—hardly acknowledged existence of multigrade schools. Only the federal subsystem of community instructors, contracts students who have finished secondary school (age 15) or high school (age 17) for a social service of one year in a community which provides them with lodging and food, while the federal system provides a stipend, three months of pre-service training and a special curriculum and teaching aids for multigrade teaching (the latter designed by a group from my department (Rockwell, E, Candela, A, Fuenlabrada, I, Block, D, Navarro, L, and Taboada 1988-1992; see also Fuenlabrada and Taboada 1992, Rockwell 1994) In general primary and bilingual schools there are, aside from free national textbooks by grade and subject, no special curricula or teaching aids and materials for multigrade teaching One of the teachers has to comply the task of direction of school and maintain contact with the supervisor Although supervisors should visit each school three times a year, they hardly ever get there, and rather cite "direction in charge" frequently (about once every fourteen days) to fetch or deliver paper-work the school bureaucracy demands, each travel implying one or two days, lost for teaching.

Teachers frequently use Monday to travel to schools and Thursday afternoon to go back to their home, legitimately so every fortnight, because they have to cash their salary on Friday They have a right to twelve working days per year to attend personal business Add official teachers union meetings, local feasts, inter-school competitions, and days taken for personal reasons and you find, as we did in our study, that out of the official calendar of 180 days of working (raised to 200 days in 1994, but final qualifications still have to be delivered one month before the end of the year), teachers really attend teaching from 80 up to 150 days a year

Changes in School-effectiveness: Permanency and Absenteeism of Teachers

One of the main issues in PARE was school attendance It paid an additional basic salary to teachers working in poor, distant communities Teachers had to sign an additional contract which implied commitment to stay for two years and to work with the community.

Fulfilment of this contract was to be watched by the school supervisors and the local authority in the village, who had to sign monthly attendance charts of teacher(s)

Up to the end of our study it did not help to fight absenteeism. Inspectors did really supervise, and teachers found ways of finding an arrangement with the village authority to sign their sheet of attendance· by sending the form through the children to be signed if the school was to receive learning materials, by informal bartering ("you sign and I'll get you some merchandise you need") or by outright splitting of the extra-salary. However, it decreased dramatically the second problem turnover in schools. Formerly teachers were ready to leave the community for any opening at a better place, even throughout the school year (and politics of personnel allows them to do it), so that some classes had up to three turnovers of teachers per year, many schools with two teachers become schools with only one to attend six grades, and others had to be closed down for months

PARE—and its subsequent programme PAREB, which is implemented in 10 more states is trying to overcome some of the difficulties, by specifying—as we suggested in the additional contract the duty to attend teaching (formerly it contained vague references to work with the community in a sort of revival of teaching traditions of the twenties and thirties) and, above all by informing the whole community through direct contacts and radio campaigns, especially upset mothers and adolecents, of their rights. We also recommended to select teachers to be assigned to distant and isolated work on the basis of previous teaching experience, job fulfilment and family status.

However, the big decision to be made by Mexican government is to tackle the problem of school supervision, which is tied with the melange between school authorities and national teachers union and of national teachers union with the ruling State party (since 1929) Strengthening community participation and national testing (as proposed in The National Programme for Development of Education, 1995-2000), might be a way of squeezing school bureaucracy and teachers union The alternative is to rely on non-unionised, non-professional services as for example the Community Instructor (See Weiss & Ezpeleta 1995)

MULTIGRADE TEACHING

School day in those wide spread communities, where children have to walk up to three quarters of an hour to reach the school house, starts at 9·00 A.M, but teachers usually give allowance of half an hour for cleaning the accumulated dust or dirt and for late arrivals. There is a break of one hour at about eleven, where children living nearby go to get something to eat, and the day ends between 1 PM and 2 P.M. As it is not unusual for a member of the community or another teacher to stop by and discuss something, contents are normally attended for 2 to 3 hours. (The same amount observed in urban schools. Rockwell and Galvez 1982.) That is children receive attendance not for 800 hours per school year, as officially stipulated, but for 160 hours (80 days × 2 hours) with lazy teachers or for up to 450 hours (150 days × 3 hours) with teachers who attend their job. If there is only one teacher for the six grades, he normally differentiates between grade 1, which demand a lot of his attention, grade 2 and grade 3 as one subgroup and 4th to 6th graders as a third subgroup In schools with two teachers, situation is apparently better, they split students in two groups, one teacher attending grade 1 to 3 in one room, the other grade 4 to 6 in another However, frequently one of these two teachers is absent (on official business as director-in-charge or on personal matters), so that the other has to attend two groups in two different rooms. In schools with three teachers they usually group grades 1 and 2, 3, and 4, 5 and 6

Few teachers have tried variations to these splittings In one case, one of the teachers attends grades 1 and 2, the other 3 to 6, mainly because they have a larger number of students in the first two grades In this school they have also tried a much more important variation· attending each grade for an additional hour per week in the afternoons However school-system (that is informal pressure among colleagues, union and supervisors) does not encourage these experiments, which lead to a longer working day. Potentially there might—as we suggest—be arrangements of attending younger children in the morning and older children in the afternoons, if supplementary pay is incorporated in a salary for full-day working.

As teachers have not been trained to attend multigrade situation some handle it very inefficiently. In quite a few cases students had to wait up to 30 minutes after start of the class before being assigned any task, while the teacher assigned work and gave explanations to other grades

The general problem most frequently observed, is that teachers do not know which work should and could be integrated between different grades, and which work should and could be differentiated between grades:

(a) some teachers—especially teachers who attend grades 1 to 3—differentiate all work between grades, their underlying rationale seems to be that students who cannot read or write, cannot learn with older children:

(b) other teachers hardly differentiate at all, especially teachers who attend grades 4 to 6; there seems to the underlying rationale of a three or four year curriculum—historically valid until the fifties—still working in rural schools, which limits primary school syllabus more or less to grade 3 and grade 4 and to its repetition in grades 5 and 6, this situation does not take advantage of the possibilities of self-administered learning in upper grades.

Few teachers work on joint activities that can be differentiated later on into tasks specific to each grade. In a more rudimentary form one woman teacher, working the first three grades, and trying to integrate subject learning into "global" teaching, started with a classroom discussion on time, hours and calender, and then assigned a drawing to grade 1, copying the phrase "the year has twelve months" to grade 2 and to writing the name of the twelve months to grade 3 Another teacher (a man), who taught mathematics in grades 4 to 6, was exercising one day on problems and corresponding algorithms with the whole class and without differentiating between grades (problems corresponded to grades 3 and 4), the next day he assigned tasks from a textbook of mathematics to each grade, using a widespread criteria for differentiation· the higher the grade, the more digits in divisions and multiplications Only one teacher showed an extraordinary capacity of combination and discrimination: for example, discussing a lesson of history with all grades and assigning task with different degrees of difficulty and work with the respective textbooks later on, or playing a picture lottery with all grades and asking grade 1 and 2 to copy some pictures and its name, grades 3 and 4 to classify pictures into families (trades, plants, animals, and so on) and grade 5 and 6 to write a tale linking three or four lottery cards.

It is obvious that multigrade teachers need guidance, through pre-service and in-service teacher training courses and exchange of experience, but also in form of teacher hand books and specific teaching and learning materials. There are fundamentally two models available in Latin America, Colombia's New School (Colbert and Mogollón 1990; Schiefelbein 1991, Tirres 1991) and the less known Guide for the Community Instructor developed in Mexico by our department (Rockwell, Candela, Fuenlabrada, Block, Navarro, Taboada 1988-1992; see also: Fuenlabrada and Taboada 1992; Rockwell 1994) These guides differ fundamentally in the following respect: Colombia's New School relies mainly on self-administrated learning materials for groups of three students. Mexico's Guide for the Community Instructor reduces the six traditional grades to three levels or learning bundling the syllabus of grades 1 and 2, 3 and 4, 5 and 6 and develops "didactic situations" for all four major subjects, the three levels and its central learning problem. It also guides teachers on how to conduct joint activities with one, two or all three levels, in order to promote learning between children of different ages and advancement, and shows how to derive differentiated task by level of learning. As persons involved in Colombia's New School admit, there are difficulties for self-administered learning—especially of reading and writing—in the first grades. Therefore, I think, both models should be combined, relying more on teacher guided work in the first grades and on self-administrated work in the upper grades.

Although all curricular subjects are of equal importance, this exposition—for questions of time and space—will be limited to the teaching of language, especially reading and writing, the subject that concentrates most time and attention by teachers

Oral expression is extremely limited to answering question of teachers that allow only the correct answer in form of a few words This is especially worrying as in some of the communities studied, the maternal language is not Spanish, but an indigenous one, as parents pressed for getting a general primary school and not the less prestigious bilingual school

Literacy teaching is mainly restricted to a mechanical instruction in phonetic method Throughout grades 1 and 2 teacher and students repeat first letters, then, syllables, finally words and phrases They repeat aloud or identify—in chorus or individually—letters, syllables and words (without meaning) and then copy them, while teacher's are watching over the correct tracing of graphs This way of teaching converts reading into deciphering of the correspondence between graphs and sounds in a more or less fluid way and writing into copying graphs without meaning Few teachers intent to enrich this mechanics by onomatopoeic procedures, even use of textbooks is scarce in the first two grades There seems to have been impact on teachers who assisted to the literacy course, offered by in-service teacher tranining of PARE, as those teachers, although relying dominantly on the old mechanical way of phonetic method, tried to enrich classes by using sometimes whole words and complete phrases with meaning or by narrating a tale.

In grades 4 to 6, also dominate mechanical activities (ordered by their frequency)· reading in silence, copying of textbook interrogations and closed questionnaries on texts or oral lessons; far less frequent are more open forms· open ended questioning, resumes, narration of events and observations, open text. Even grammar—one of the favourite subjects of teachers in upper grades in urban or larger rural schools—is absent in multigrade schools

As Ferreiro (Ferreiro and Teborosky 1982, Ferreiro 1994, Ferreiro and Rodriguez 1994) points out, children are taught linkages between graphs and sounds (some of them non-existent even in Spanish) and leaves the task of making out the rules of our alphabetic system to the children themselves, but, above all, children do not produce meaningful reading and writing at all. As they have to dominate the graphs first they cannot be taught anything meaningful before that. Multigrade teaching is considered a severe disturbance, although it might be used advantageously to introduce them to different types of text and reading, for example, by making younger children watch older ones reading to them aloud, as urban middle class parents do One of the major problems of literacy learning in rural communities is the absence of functional contexts of reading and writing in the surroundings. School, instead of compensating this lack by prividing functional contexts whithin the classroom, that is working with different types of text speech, impoverishes it further

Change of literacy teaching not only requires primarily a change in methods, but of conception of learning processes and understanding of the nature of reading and writing, as Ferreiro (1982) points out. But you cannot rely only on conceptual change (as Literacy course of PARE intended, see below), nor only on innovative techniques, like, for example, books produced by children and community, use of texts written by adults of the communities, use of typewriters, writing of letters and dreams, as Ferreiro and Rodriguez (1994) successfully demonstrated. However, most of these techniques, I think of Freinet and Mexican rural education in the twenties and thirties, have been known for quite some time, and still are hardly used by teachers. Also experience with the Guide for the Community Instructor shows, that they hardly use the part for Spanish in the first two grades, because of absence of method of teaching. There has to be a clear didactic guidance, which rescues some of the practice in use by teachers—phonetic method and global-analytical method—and tries to show didactic situations, where old contents taught in a new form will have a different meaning.

USE OF SCHOOL LIBRARY AND TEACHING AND LEARNING MATERIALS

PARE provided all multigrade schools with a set of 150 books of the Reading Corner, a programme that provides different types of reading material translations of international children's books, books directed to children of different ages written and illustrated by Mexican authors, collections of folk tales including indigenous tales, books on health, agriculture and law, lotteries, games, etc. This material is perfectly adequate for enriching literacy culture in communities and classrooms and for substitution of some of the mechanical tasks teachers usually assign multigrade teaching while they attend certain grades.

However it was hardly used inside or outside the classrooms In some communities they had not agreed on building rustic furniture to store it, others feared theft and deterioration of books and kept them under key, and still another teacher, would not let them before he had read them himself. All these obstacles show how difficult it is to create a different kind of literacy conscience and of use of books—still "scared"—among non-literacy communities and hardly lierate teachers.

Most of the teaching materials distributed did not fare much better The more traditional materials were used more frequently, posters of schemes and illustrations, as well as dictionaries Others were used very scarcely maps, cards, games like picture lottery and domino, musical instruments, abacus, etc

Learning materials, on the contrary, especially the most generic ones, like notebooks, pencils, colours, scissors and glue, fared very well and soon ran out. As some teachers and parents told, they eradicated an obstacle for sending children to school. Also, balloons for different sports, enjoyed much popularity, not only among students but also among adolescents of the village

Obviously, use of school library and teaching material is strongly tied to conceptions of teaching and learning. Unfortunately the in-service training courses offered by the Programme, did not refer to the specific materials distributed and to their potential use

IN-SERVICE TEACHER TRAINING

Previous to PARE, teachers in distant multigrade schools had hardly received any in-service training courses, even those destined to spread new educational policies by multiplications (cf. Weiss 1994) They therefore were glad to be finally taken into account-even though in the first year traditional mechanisms of call for attendance to courses only reached the less distant schools—especially as they were paid travel and living expenses and as the courses were "serious," counting with clearly structured curricula and learning materials

However, most of those who had attended one or several of the five courses, only remembered sketchily overall content of courses or some special feature "different ways children learn" (*Resources of learning*), "how to teach globally" *(Multigrade teaching), "it was about history of mathematics"* (Teaching of mathematics), "different stages of reading and writing" *(Written languages in primary schools)*

Analysis of course material showed several curricular blunder (a) contents were mostly general conceptions of teaching and learning, with a strong emphasis on constructivist learning theory, but leaving translation to teaching largely to the imagination of teachers, at the same time important subjects like different ways of organisation of multigrade teaching or use of the specific material distributed were missing, (b) most material was in form of anthologies of texts not especially written for teachers, some of them even clearly communications between researchers; (c) although there were some practical activities of teaching situations, they usually came at the end of each course

Observation of training courses showed that teachers had a hard time to understand texts, that they usually read only one of the three to four texts assigned between classes, their reading did not differ very much from the reading they expect normally from their older students, that is underlining and copying phrases and paragraphs and reproducing them textually; much time was spent on definitions, few times on exposition of proposals for new "teaching and learning situations"

It seems important to overcome the dichotomy discussed throughout Latin America between educators: on the one hand those who defend that teachers claim for methods, and on the other hand those who believe that imposing methods and techniques on teachers is a violation of their professional status and try to convert them into critical, reflexive teachers doing research on their own practice; and finally those who believe that there is no way to rescue teachers and propose to rely dominantly on materials for the student In our department we have come to the conviction that massive change requires concrete innovative materials for teachers and students, that rescue some of the previous practice but also show new ways of doing things These materials have to be accompanied by brief conceptual explanations and above all by the experience—and exchange of experience—how they actually work

Observation of the in-service training courses offered by PARE also showed, that courses taken during two weeks during vacation period had good attendance, while the other format, which spread the course through 10 Saturdays, had problems of growing absenteeism; although this type of course, allowed more practical applications in classroom during the week and its discussion in the next meeting.

It seems important to provide for multigrade teachers, who have scarce contacts with colleagues and hardly any support by directors and supervisors (that exceed administrative and labour procedures), meetings on a regular basis with the purpose to learn new approaches and techniques and to exchange their experiences, as part of their in-service professionalisation. These meetings, however, cannot be held every week, as teachers working or living during the week in distant communities have other obligations at home. We suggest monthly meetings and concentrations during vacation periods

CONCLUSION

Through the paper I have tried to put conclusions and proposals at the end of the corresponding sections. So it is suggested that various branches of the Secretary of Public Education read our evaluation report with much interest and that the National Programme of Educational Development 1995-2000 (SEP 1996) incorporated quite a few of our suggestions Right now we are under contract by CONAFE to design a proposal of adaptation of multi-level teaching (as proposed in the guide for the community instructor) to general multigrade primary schools (Fuenlabrada and Weiss [coord]; Candela, Diaz, Ezpeleta, Mercado 1995). I also hope that this paper showed that the ongoing dialogue in our department between cognitive, didactic and ethnographic approaches is helpful in evaluation of classroom practices.

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A Multi-level and Multi-indicator Framework for Monitoring Education Quality in Primary Schools

Yin Cheong Cheng

In the light of the recent trend of education indicator development and the advances in school effectiveness research, this paper develops a framework including multi-levels and multi-indicators to assess education quality in schools The framework is more concerned with process characteristics in schools and the selection of multi-indicators is supported by research evidence from the past studies and the pilot study. It assumes that education quality in school can be indicated by the overall performance of school members at the individual level, the group level, and the organisational level, the affective, cognitive, and behavioural components of performance, and the satisfaction, perception, and performance of the key school actors.

In the framework, the student individual level includes indicators of students' affective and academic performance The student group level has indicators of classroom's human and physical environment and classroom management The teacher individual level includes indicators of job attitudes, satisfaction, and beliefs. The teacher group level includes indicators of social norms and professionalism The organisational level has indicators of organisational culture, structure, effectiveness, quality of school physical environment, principal-teachers relationship, leadership, and need for school improvement

The successful application of the framework to monitoring education quality of a sample of Hong Kong schools provides an example showing that the framework is feasible and useful and can serve the purposes of both internal development and external accountability. This framework can contribute to the growing public concern, policy discussion, research conceptualisation, and practice on education quality and school development in both local and international contexts

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Pursuit of education quality is one of the major themes in current education reforms in different areas of the world. For example in Hong Kong, a number of policy efforts have been put into improvement of different aspects of education such as curriculum, language teaching, student guidance, student streaming, management, teacher-student ratio, physical environment, and teacher education (Education Commission Reports 1 to 5 1984-1992; Education & Manpower Branch and Education Department, SMI 1992). Although these efforts aim at improving education quality and discharging accountability, they are seriously suffering from poor understanding of the complex nature of education quality and lack of a system of education standards and indicators for directing practices and monitoring performance. We often do not know how good our education systems are Furthermore, we know very little about how to improve or ensure education quality no matter whether at the site-level or at the system-level. These are very serious problems when compared with the huge investment in our education systems Recently, the Education Commission of the Hong Kong Government (1993) might be concerned about the problems and has set up a working group to study education standards and develop policies for quality assurance in education (Cheng 1995)

Some other rapidly developing societies in the Asia-Pacific areas are facing similar problems of education quality in development of education. Currently there are also movements of effective schools, school-based management, and educational reforms in search of education quality in developed countries such as the U.S A , the U.K., and Australia (Cheng 1993b, 1994a) There is a strong need to understand, monitor, and enhance education quality not only in some developing areas but also in some developed countries. Responding to the rapidly growing concern about education quality in the international and local contexts, this paper aims at contribution to the conceptualisation and monitoring of education quality in schools The paper will develop a framework including multi-levels and multi-indicators to assess education quality in schools.

CONCEPTUALISATION OF EDUCATION QUALITY

To different people, the definition of education quality may be different and so the indicators used to describe education quality may be different (Hughes 1988; Fuller 1986). Some may emphasise the quality of inputs to the education systems but the other on the quality of processes and outcomes The definition of education quality may be associated with the fitness for use (Juran 1988), the satisfaction of strategic constituencies' (e.g , policy-makers, parents, school management committee, teachers, students, etc.) needs, or the conformance to strategic constituencies' requirements and expectations (Crosby 1979) According to the ideas of total quality management (Tenner & Detoro 1992) and system approach, education quality may be defined as "the character of the set of elements in the input, process, and output of the education system that provides services that completely satisfy both internal and external strategic constituencies by meeting their explicit and implicit expectations" (Cheng 1995).

Since the conception of education quality involves the input, process, output and multiple constituencies of an education system, it is multidimensional and cannot be easily assesed by only one indicator Furthermore, the expectations of different constituencies on education may be very different, if not contradictory It is often difficult for a school or an education institute to meet all the expectations or needs at the same time. Therefore, it is not rare that the education quality of a school is high to the perceptions of some constituencies but not to the other, or, some aspects of a school may be high quality but the other aspects may be low quality (Hughes 1988).

In order to assess education quality, different indicators may be developed to give information about the performance of an education system in different aspects Education quality indicator may be defined as the indicator used to describe the key aspects of education quality in input, process, and outcome at the school level or at the system level. The difference in the choice of and the emphasis on indicators may reflect the diverse interests and expectations among the concerned constituencies.

Currently, there is strong interest in the international comparison of the functioning of educational systems and the development of international education indicators for planning and monitoring the education systems. Nuttall (1990), Herpen (1989), and Bottani (1991) can provide the information about the OCED (Organization for Economic Co-operation and Development) International Education Indicators at the system level.

According to Scheerens (1990) and Herpen (1989), the development of education indicators seems to have experienced three trends The first trend was the transition from social indicators of education (that was used to describe the educational aspect of the population) to education indicators used to describe some characteristics (mainly input and resource measures) of education systems. The second trend was the shift towards more comprehensive indicator systems by adding output and context measures and growing interest in manipulable factors and process characteristics. The third trend was more concerned with process characteristics in schools and therefore was to measure data at more than one aggregation level (i.e , national, school, classrooms, students, etc). Up to now there seems to be no universal set of education indicators that is appropriate for all purposes of different regions or countries.

Since we are more interested in education improvement and school effectiveness, the development of education quality indicators may be in light of the third trend, focused more on the process characteristics According to Cheng (1995), the literature that can contribute to the development of a system of indicators of education quality may be divided into three categories.

(1) the previous studies on education indicators, performance indicators, quality indicators, and accountability system indicators, such as Nuttall (1990), Windham (1988), Oakes (1986), Benveniste (1987), Scheerens (1990), and Hopkins & Leask (1989),
(2) the studies on school effectiveness and instructional research, such as Wilson & Corcoran (1988), Cheng (1993c, 1994b,c,d), Mortimore (1993), Wang & Walberg (1991), Kyle (1985), and Brophy & Good (1986); and
(3) the studies on organisational effectiveness (such as Cameron & Whethen 1983, Cheng 1993a, 1994a)

A MULTI-LEVELS AND MULTI-INDICATORS FRAMEWORK

Based on the above discussion, this paper can develop a framework including multi-levels and multi-indicators to assess education quality in schools In the light of the current trend of education indicator development, the framework is more concerned with process characteristics in schools and the selection of multi-indicators is based on the previous studies on education indicators, school effectiveness, instructional research, and organisational effectiveness. The collection of data is conducted at more than one aggregation level The framework can be carried out in form of both school self-evaluation and external evaluation and serves the purposes of both internal development and external accountability.

Specifically in this framework, education quality in school is defined by the following characteristics

(1) it represents the overall performance of school members at the individual level, the group level, and the organisational level;
(2) it includes the affective, cognitive, and behavioural components of performance, and,
(3) it can be indicated by the satisfaction, perception, and performance of the key school actors.

Based on this conception and the past studies, a framework of multi-indicators at the multi-levels is developed It includes the student individual and group levels, the teacher individual and group levels, and the school organisational level At the student individual level, indicators are students' affective and academic performance At the student group level, the indicators are classroom's human and physical environment and classroom management. The teacher individual level includes indicators of job attitudes, satisfaction, and beliefs The teacher group level includes indicators of social norms and professionalism. At the organisational level, the indicators are organisational culture, structure, effectiveness, quality of school physical environment, principal-teachers relationship, leadership, and need for school improvement. In sum, the framework is rather comprehensive and the relevance, validity, and reliability of nearly all the selected indicators are supported by the strong research evidence in the past studies The detail of the indicators at different levels is illustrated as follows·

Indicators at the Student Individual Level

(a) *Indicators of student attitudes* They are the levels of positive attitudes put towards self, peers, teachers, the school, and learning These indicators were developed and tested in Cheng (1994b)·

- Self concept
- Attitude to peers
- Attitude to teachers
- Attitude to the school
- Attitude to learning
- Attitude Index (=(self + peers + teachers + school + learning)/5)

(b) *Student satisfactions·* They are the extents to which the student is satisfied with different aspects of school life They were developed from the literature of quality of work life and organisational behaviour (Cammann et al 1983; Oldman & Hackman 1981).

- Social satisfaction (i e., with social relations in school)
- Intrinsic satisfaction (i.e., with opportunities to perform & learn)
- Extrinsic satisfaction (i e., with school arrangements)
- Overall satisfaction (i e , with the learning life in school)
- Satisfaction Index (= (social + intrinsic + extrinsic + overall)/4)

(c) *Negative feelings* They are negative indicators of student feeling about learning and the school They were developed in this education research project.

- Feeling of homework overload (–)
- Intention to drop-out (–)

(d) *Attainment test results.* They are academic indicators got from the results of the Hong Kong Public Test-Attainment Test on the following subjects:

- Chinese
- English
- Mathematics

Indicators at the Classroom Level

(a) *Indicators of classroom climate.* They are indicators of social climate among students and between students and teacher in classroom. They were adapted from Moos & Tricketts (1974) and had been used widely in different areas and countries, including the following nine indicators·

<among students>

- Affiliation (i e., the level of friendship students feel for each other)
- Order and Organisation (i e , the level of students behaving in an orderly and polite manner and classroom activities being well organised)
- Competition (i.e., the level of students competing on academic achievement/recognition)
- Involvemnt (i e., the level of students having attentive interest in class activities)

<students-teacher>

- Teacher support (i.e., the amount of teachers' help and concern provided to the students)
- Rule clarity (i.e , the level of teachers demanding on establishing a set of clear rules and being consistent in dealing with students who break rules)
- Task orientation (i.e , the level of teachers completing planned classroom activity)
- Teacher control (i e , the level of teachers strictly implementing the classroom rules)
- Innovation (i e., the level of teachers being innovative on teaching methodology)

(b) *Indicator of quality of classroom physical environment* This is an overall quality indicator of classroom physical environment in terms of facilities, space, arrangements, neatness, cleanliness, and comfort, perceived by students or teachers. The indicator was developed in the education quality project and had been used in Cheng (1994b),

(c) *Indicators of classroom management.* They are the types of power base the class master uses to influence students' compliance in classroom, perceived by students. They were developed and adapted from French and Raven (1968) and Ho (1989) and had been used and tested in Cheng (1994b, d);

- Professional power (i e., on professional knowledge and skills)
- Position power (i e , based on school regulations or teacher position)
- Reward power (i.e., based on providing rewards)
- Coercive power (–) (i.e., based on exercising punishment)
- Personal power (i.e., based on class master's own personality and charisma)

(d) *Indicators of classroom arrangements:* They were developed in the education quality project, including:

- Insufficient recess time (–) (i.e , for students' to have a break or go to toilet)
- Ignorance of art, physical education, and music (–) (i.e., replaced by academic subjects)
- Appropriateness of class size (perceived by teachers)
- Per cent time for teaching activities (perceived by teachers)
- Per cent time for student behaviour problems (–) (perceived by teachers)

Indicators at the Teacher Individual Level

(a) *Indicators of job satisfaction:* They were adapted from the literature of quality of work life (Cammann et al. 1983: Oldman & Hackman 1981)·

- Social satisfaction (i.e , with the social relationship with colleagues)
- Extrinsic satisfaction (i.e., with the salary or benefits provided)
- Intrinsic satisfaction (i.e , with the opportunities to develop and learn)
- Influence satisfaction (i.e , with the opportunities to participate in decision-making and be autonomous)

(b) *Indicators of job attitudes/feelings* They were adapted from the literature of quality of work life (Cammann et al 1983)

- Commitment to the job (i e , the level of being committed to the job)
- Job challenge (i.e , the level of feeling challenges in teaching job)
- Job meaning (i.e , the level of feeling that teaching job is meaningful)
- Job responsibility (i e., the level of feeling responsibility in the job)
- Self-report of effort (i.e., the level of effort put into the job reported by self)

(c) *Indicators of teaching efficacy.* They were adapted from Gibson & Dembo (1984), Matthes, Tollerud, & Langeveldt (1989), and Woolfolk & Hoy (1990).

- Personal efficacy (i e , the belief that personal effort in teaching can improve student learning)
- Personal efficacy (i e , the belief that personal effort in teaching can improve student learning)
- General efficacy (i e., the belief that teaching can improve student learning even under the disadvantages from students' families)
- Teaching efficacy (= personal + general)

At Teacher Group Level

(a) *Indicators of social norms* They are indicators of the social relationship or group feelings among teachers. They were adapted from Halpin (1966) and Halpin & Croft (1963) and had been used widely in different studies (Cheng 1991)

- Intimacy (i e., the close social relationship among teachers)
- Esprit (i e., the working morale of teachers)
- Disengagement (–) (i e., the level of teachers being disengaged from the school)
- Hindrance (–) (i.e., feeling of being burdened with unnecessary work)

(b) *Indicator of teacher professionalism.* This is the tendency of teachers being committed to the professional code It was developed and used in Cheng (1992b).

(c) *Indicator of quality of physical environment of staff room* This is an overall quality indicator of staff room physical environment in terms of facilities, space, arrangements, neatness, cleanliness, and comfortability, perceived by teachers It was developed in the education quality research project

Indicators at the Organisational Level

(a) *Strength of organisational culture* It is the strength of sharing values, beliefs, and assumption about school mission, teaching, learning, and management among school members Based on the idea of Alvesson (1987) and Price and Mueller (1986), it was developed and tested in Cheng (1993c).

(b) *Indicators of organisational structure.* They were adapted and developed Oldman & Hackman (1981) and Hage & Aiken (1967) and had been used in Cheng (1993c, 1994c).

- Formalisation (i e , the level of school functioning being formalised with clear written policies, procedures and records)
- Hierarchy of Authority (–) (i e , the level of decision-making being centralised in school)
- Participation (i.e., the level of teachers participating in decision-making and planning)

(c) *Indicator of organisational effectiveness.* This indicator measures the level of effectiveness of school functioning in terms of productivity, adaptability, and flexibility as perceived by teachers It was adapted from Mott (1972) and had been used in different studies (Cheng, 1991c, 1993c)

(d) *Indicator of quality of school physical environment* This is an overall indicator of quality of school physical environment in terms of facilities, space arrangements, neatness, being planted, cleanliness, and comfort, as perceived by students or teachers; It was developed in the education quality research project.

(e) *Indicator of principal-teachers relationship·* The indicator describes the degree of satisfaction with the social and working relationship between principal-teachers, perceived by teachers It was developed in the Chan, Cheng, & Hau (1991)

(f) *Indicators of principal's leadership.* Based on Bolman & Deal (1991) and Sergiovanni (1984), they were developed and used in Cheng (1994c).

- Human Leadership (i e , the extent to which the principal is supportive and fosters participation)
- Structural Leadership (i e , the extent to which the principal thinks clearly and logically, develops clear goals and policies, and holds people accountable for results)

- Political Leadership (i.e , the extent to which the principal is persuasive and effective at building alliances and support and solving conflicts)
- Symbolic Leadership (i.e , the extent to which the principal is inspirational and charismatic)
- Educational Leadership (i.e., the extent to which the principal emphasises and encourages professional development and teaching improvement)

(g) *Indicator of school improvement need.* This indicator assesses the need for improvement in 15 aspects of school functioning such as parental support, quality of student input, instructional resources, physical environment and facilities, staff professional development, morale, student performance, decision participation, teacher appraisal, and administrative procedures and management The indicator was developed in a school management reform research project (Cheng 1992a).

The psychometric properties of the above indicators have been tested and documented in the past studies or pilot studies. Each of them may include one to a few of questionnaire items. In addition to these indicators, there are also some indicators about the demographic characteristics of principals, teachers, students, the school and the community, administrative structure, financial management, personnel administration, curriculum and instruction, extracurricular activities, external relations, discipline and regulations, and communications Since most of the Hong Kong schools are aided schools, they are established and operated on the basis of the Codes of Aid issued by the Education Department of the Hong Kong Government. The sample of schools is relatively homogeneous in input quality in terms of salary structure, professional qualification of teachers and administrators, promotion structure, teacher-class ratios, school facilities, formal curricula to be completed, public examination system, supporting personnel (such as technical, clerical, cleaning staff), formal opportunities of professional training and development, and supervision by the Hong Kong Education Department (Education Ordinance 1971). Therefore, this framework does not emphasise the quality of input that is often standardised in Hong Kong schools, but is more concerned with the quality of process and outcome.

APPLICATION OF THE FRAMEWORK—A STUDY OF EDUCATION QUALITY IN SCHOOLS

In order to illustrate the application of the framework to monitoring education quality in schools, the findings of one study using this framework in 62 primary schools of one religious sponsoring body are summarised as follows:

This was a survey study conducted in May 1991 and June 1993 and it aimed to provide the sponsoring body and its schools the information about education quality in their schools that can be used to further develop their schools, administrators, teachers, and students.

Comparatively the survey in 1993 is more comprehensive than that in 1991 Therefore the findings presented in the report are mainly based on the data collected in 1993.

The sample schools were 29 AM schools (morning schools), 30 PM schools (afternoon schools), 3 whole day schools. If the AM and PM sessions in one school site have the same principal, they were taken as one school in the analysis. Otherwise, they were taken as two separate schools in the analysis.

The school age of the sample ranged from 4 to over 99 years Number of classes in each sample school ranged from 6 to 48 with the mean around 23 classes. The average number of teachers in each school was 28 with the range from 9 to 60. The average number of students in each school was 764 with the range from 124 to 1,655.

The survey in 1993 included 56 principals, 1,407 teachers, 219 classes, and 7,102 mainly primary 6 students. In order to cut down the response set and the time taken for completing the measures, the numerous indicators of the above framework were divided and included into eight different sets of questionnaires to collect information: One for principals, one for teacher representatives, three for teachers, and three for students. The sets of teacher questionnaires and student questionnaires were completed by different groups of teachers and students randomly selected within each sampled school and each sampled class The time taken for each teacher or student to complete the questionnaire was round 30 minutes For the principals, the time varied from 40 minutes to 3 hours, depending on the availability and readiness of some school data.

Description of Quality Profile of the Schools and the Implications

In order to map an overall profile of education quality in the sample schools that can inform the concerned how good the education quality is provided in the schools, all the above indicators of the framework were used to describe the quality of school process at the student level, the teacher level, and the school organisation level

For the positive indicators, the higher the performance, the higher the quality can be promised at these indicators

For the negative indicators, the higher the performance, the lower the quality can be promised at them.

In general, most of the indicators should be positive indicators except those denoted by the sign (–) at their ends, such as negative indicators: Feeding of homework overload (–), Intention to dropout (–), Coercive power (–), Insufficient recess time (–), Ignorance of art, physical education, and music (–), per cent time for student behaviour problems (–), Disengagement (–), Hindrance (–), Hierarchy of authority (–), and Need for school improvements (–)

School performance on each indicator can be classified into three types.

High Performance is defined by the value of school mean on one indicator larger than (mid point value of the scale + 0 5).
Low Performance is defined by the value of school mean on one indicator less than (mid point value of the scale – 0.5).
Marginal Performance is defined by the value of school mean on one indicator between high performance and low performance.

Based on this classification, the quality profile of the sample schools was mapped by the percentages of schools with high, low, and marginal performance on each indicator, as shown in Figure 1.

In Figure 1,
per cent of schools with high performance is denoted by
per cent of schools with low performance is denoted by
per cent of schools with marginal performance is denoted by

In order to illustrate how the quality profile mapped by the framework can be used to monitor and improve education quality, a brief discussion of its characteristics at the different levels are shown in Figure 1.

Indicators	Average School Means	(Mid-point of the Scale)
<Student attitudes>		
Self concept	3 16	(3)
Attitude to peers	3 95	(3)
Attitude to teachers	3.37	(3)
Attitude to the school	3 54	(3)
Attitude to learning	3.58	(3)
Attitude Index	3 53	(3)
<Student satisfaction in school>		
Social satisfaction	3 62	(3)
Intrinsic satisfaction	3 53	(3)

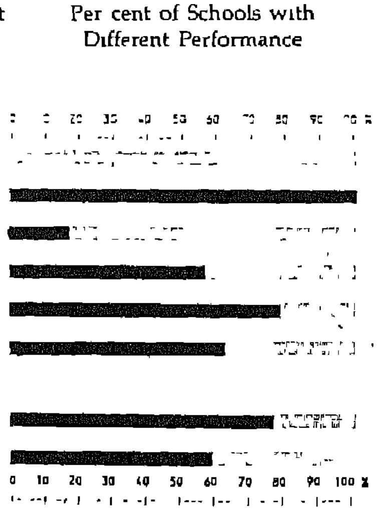

Figure 1. Quality profile of the sample schools.

Extrinsic satisfaction	3.61	(3)
Overall satisfaction	3.73	(3)
Satisfaction Index	3.60	(3)
<Negative Feelings>		
Feeling of homework overload (–)	2.80	(3)
Intention to dropout (–)	1.64	(3)
<Attainment test results>		
Chinese	66.68	(63.59)
English	50.39	(47.64)
Mathematics	23.75	(21.69)
<Classroom climate>		
Affiliation	3.64	(3)
Order and Organisation	2.92	(3)
Competition	3.47	(3)
Involvement	3.19	(3)
Teacher support	3.84	(3)
Rule clarity	3.68	(3)
Task orientation	4.12	(3)
Teacher control	3.83	(3)
Innovation	3.41	(3)
<Quality of classroom physical environment>		
Perceived by students	3.31	(3)
Perceived by teachers	2.95	(3)
<Power bases of class master>		
Professional power	3.88	(3)
Position power	3.73	(3)
Reward power	2.56	(3)
Coercive power (–)	2.82	(3)
Personal power	3.16	(3)
<Classroom arrangements>		
Insufficient recess time (–)	3.11	(3)
Ignorance of art, physical education, and music (–)	2.64	(3)
Appropriateness of class size	2.64	(3)

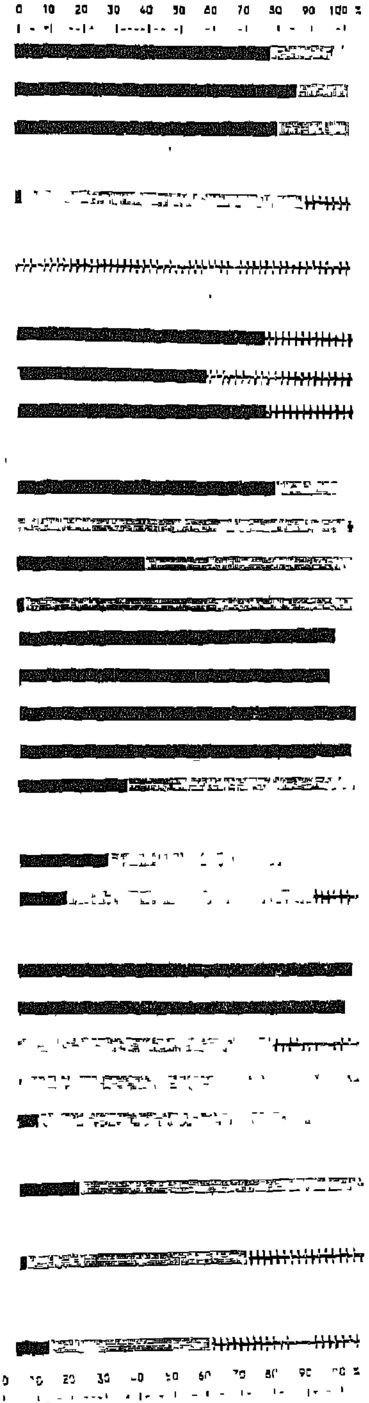

Figure 1 (Contd)

Per cent time for teaching activities	2.89	(3)##
Per cent time for student behaviour problems (–)	1.63	(3)###
<Job satisfaction>		
Social satisfaction	5.52	(4)
Extrinsic satisfaction	4.21	(4)
Intrinsic satisfaction	4.66	(4)
Influence satisfaction	4.30	(4)
<Job attitudes/feelings>		
Commitment to the job	4.87	(4)
Job challenge	5.03	(4)
Job meaning	5.37	(4)
Job responsibility	5.95	(4)
Self-report of effort	6.11	(4)
<Teaching efficacy>		
Personal efficacy	3.62	(3)
General efficacy	2.60	(3)
Teaching efficacy	3.12	(3)
<Social Norms>		
Intimacy	4.55	(4)
Esprit	4.67	(4)
Disengagement (–)	3.95	(4)
Hindrance (–)	4.54	(4)
<Professionalism>	5.69	(4)
<Perceived quality of physical environment of staff room>	2.83	(3)
<Strength of Organisational Culture>	3.07	(3)
<Organisational structure>		
Formalisation	4.28	(4)
Hierarchy of authority (–)	4.74	(4)
Participation	4.19	(4)

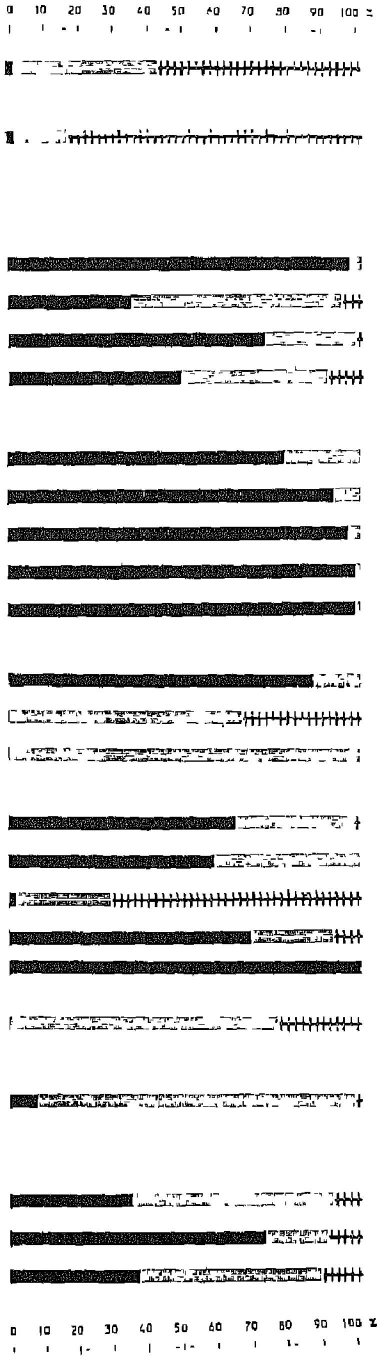

Figure 1 (Contd.)

<Organisational effectiveness>	3.31	(3)
<Quality of school physical environment)		
Perceived by students	3.20	(3)
Perceived by teachers	2.87	(3)
<Principal-teachers relationship>	4.52	(4)
<Principal's Leadership>		
Human Leadership	4.12	(4)
Structural Leadership	4.39	(4)
Political Leadership	4.09	(4)
Symbolic Leadership	4.16	(4)
Educational Leadership	4.59	(4)
<Need for school improvements> (–)	5.17	(4)

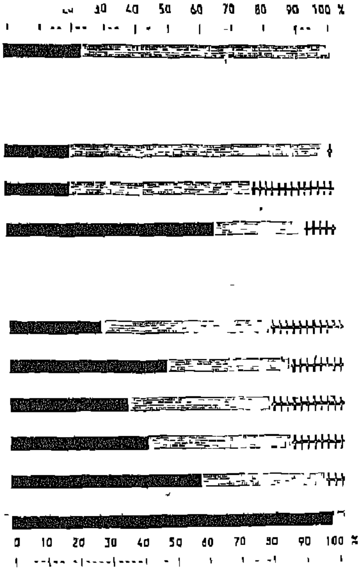

Figure 1 (Contd.)

Note

High performance is defined by the value of school mean larger than (mid point value of the scale + 0.5),

Per cent of schools with high performance is denoted by

Low performance is defined by the value of school mean less than (mid point value of the scale – 0.5);

Per cent of schools with low performance is denoted by

Marginal performance is defined by the value between high performance and low performance

Per cent of schools with marginal performance in denoted by

Note

# The number in bracket shows the average score of Hong Kong primary six students

## High performance is defined by the value larger than/equal to 4 (i.e. 75 per cent or above of class time used for teaching activities) Low performance is defined by the value less than 3 (i.e. 50 per cent of class time used for teaching activities) Marginal performance is defined by the value between 50 per cent and 74 per cent of class time used for teaching activities.

### High performance is defined by the value larger than/equal to 3 (i.e. 50 per cent or above of class time used for student problems) Low performance is defined by the value less than 2 (i.e., 25 per cent of class time used for student problems) Marginal performance is defined by the value between 25 per cent and 49 per cent of class time used for student problems

1 *Quality at the Student Individual Level*

Student Attitudes. All the sample schools had marginal performance on student self concept but high performance on attitude to peers For the indicator "attitudes to teachers," only 20 per cent of schools had high performance but 80 per cent of schools with marginal performance. About 57 per cent and 79 per cent of schools had high performance on attitudes to the school and learning. Compratively, great effort should be put to enhance student's positive attitudes to self and teachers

Student Satisfaction: Sixty-one per cent to 75 per cent of the schools had high performance on student's social satisfaction, intrinsic satisfaction, and extrinsic satisfaction but no low performance on any satisfaction indicators. There is still room for enhancing student satisfaction, particularly on intrinsic satisfaction

Negative Feeling In average at the school level, there seemed no strong feeling of homework overload (only 1 8 per cent of schools with high performance) nor intention to dropout (0 per cent of schools with high performance)

Attainment Test Results. In general, the sample schools had good or satisfactory student attainment test results. About 73 per cent and 75 per cent of them performed above the average in all Hong Kong primary schools in Chinese and mathematics tests and 57 per cent of them above the average in English in 1993 Comparatively, they may consider to put more effort to improve English learning, particularly in those schools (43 per cent) below the average.

2. *Quality at the Classroom Level*

Classroom Climate The Classroom climate of the sample schools seemed satisfactory and positive particularly on the aspects of Teacher Support, Rule Clarity, Task Orientation, and Teacher Control, with over 90 per cent of the schools with high performance. The teachers and administrators may consider to further develop the classroom climate on the aspects of Order and Organisation, Competition, Involvement, and Innovation.

Quality of Classroom Physical Environment To the overall perceptions of both students and teachers, the quality of classroom physical environment in the sample schools might not be so good to teaching and learning. Only in 25 per cent and 13 per cent of the schools, students and teachers felt good. In 75 per cent of the schools, the quality was perceived as marginal. Obviously, those schools (about 12 per cent) in which classroom environment was of poor quality as perceived by teachers need imporovement.

Power Bases of Class Master. In 91 per cent to 96 per cent of the sample schools, students complied with their class masters because of their class masters' professional power and position power. To other power bases such as reward power, coercive power, and personal power, students reported marginal influence on thier compliance to their class masters from 61 per cent to 96 per cent in the sample schools. According to the past studies, personal power, professional power, and coercive power (in negative direction) are critical to effective instructional process Therefore, the teachers should be encouraged to use more personal power (e g , as much as professional power) and to reduce further the coercive power from marginal to negligible if possible

Classroom Arrangement and Management· According to the students' perception and feeling, about 61 per cent of the sample schools did not provide sufficient recess time for students to have a break or go to toilet In only one school (1.8 per cent), the lesson time of art, physical education, and music was often ignored or replaced by doing academic subjects. Teachers in 46 per cent of the sample schools felt that class size is too large for effective teaching If we assume that 75 per cent or above time of the class time should be arranged for teaching activities, only 1.8 per cent (one school) of the schools had such high performace Teaching activities often shared class time from 50 per cent to 74 per cent in 41 per cent of the schools and less than 50 per cent in 57 per cent of the schools. Handling students behaviour problems often shared class time from 25 to 49 per cent in 16 per cent of the schools and less than 25 per cent in 82 per cent. From the findings, the teachers and administrators of those concerned schools may consider to provide sufficient recess time, reduce the class size (if possible), and particularly try their best to protect the instructional time in classrooms.

3. *Quality at the Teacher Individual Level*

Teacher Job Satisfaction· In general, teachers report high social satisfaction and intrinsic satisfaction in 98 per cent and 71 per cent of the schools, and high extrinsic satisfaction and influence satisfaction in only 32 per cent and 46 per cent of the schools. Comparatively, school administrators should consider to provide more extrinsic rewards or fringe benefits (even though it is often difficult in aided schools) and more opportunities for participation in decision-making and self-managing in order to enhance teachers' job satisfaction.

Teacher Job Attitudes. According to the teachers' self report, they have positive job attitudes on all the measures such as job commitment, job challenge, job meaning, job responsibility, and effort in 75 per cent to 100 per cent of the schools.

Teaching Efficacy. Teachers in 86 per cent of the schools believe that they can make personal contribution to student learning. But to the belief that teaching as a whole can improve student learning even under the disadvantages from students' families, no school has high performance and 32 per cent of the school do not hold this belief. How to promote the belief that teaching can make a difference may be one of the important issues to be answered among our educators.

4 *Quality at the Teacher Group Level*

Social Norms: In general, the social norms among teachers in the schools seemed satisfactory. In 58 per cent and 62 per cent of the schools, teachers had high intimacy and esprit and in 84 per cent of the schools, they showed low disengagement It should be noted that in 66 per cent of the schools, teachers felt they are burdened with unnecessary workload The administrators may consider to do something on this aspect.

Professionalism In all the sample schools, teachers reported satisfactory or high teacher professionalism—commitment to students, parents, colleagues, the school, the teaching profession, and the community.

Quality of Physical Environment of Staff Room. The quality of physical environment of staff rooms in the sample schools seemed not so good to their teachers No school had high performance on this indicator. Teachers in 21 per cent of the schools were dissatisfied with their staff rooms The school administrators should improve them in terms of facilities, space, arrangements, neatness, cleanliness, and comfort

5 *Quality at the School Organisation Level*

Strength of Organisational Culture Only 7 per cent of the schools had strong organisational culture Most of the schools (91 per cent) had no strong sharing (even not lack) of values and beliefs about school mission, education process, and school functioning, among school members. The teachers and administrators may strengthen this aspect.

Organisational Structure: 33 per cent and 60 per cent of the schools were highly and moderately formalised respectively A great portion (75 per cent) of the schools was highly centralised by a hierarchy of authority and only 35 per cent of the schools allowed high teacher participation in different aspects According to the findings of past studies, the school administrators should consider to decentralise the authority (at least moderately) and encourage more participation in decision-making in order to enhance school effectiveness and school improvement

Organisational Effectiveness. According to the perceptions of teachers, only 23 per cent of the schools were effective and all the other 77 per cent had marginal performance in terms of productivity, adaptability, and flexibility. The finding suggests that there is room for the schools to improve in different aspects of schools functioning.

Quality of School Physical Environment. No matter whether to the perceptions of teachers or students, only 18 per cent to 21 per cent of the schools had high quality of school physical environment. Teachers in 25 per cent of the schools were dissatisfied with their school environment In general, administrators and teachers may consider to improve their schools in terms of facilities, space arrangements, neatness, bieng planted, cleanliness, and comfort.

Principal-Teacher Relationship Teachers in 61 per cent of the schools were satisfied with the principal-teachers relationship Nine per cent of the schools had low performance on this indicator

Principal's Leadership: Thirty-four per cent of 57 per cent of the school principals had high performance in all different aspects of leadership such as human leadership, structural leadership, political leadership, symbolic leadership, and educational leadership. Thirty-eight per cent to 45 per cent of the principals had marginal performance Sixteen per cent to 23 per cent of the principals had low performance in human leadership, political leadership, and symbolic leadership According to Cheng (1994c in press), strong leadership in these five aspects is preferable than weak leadership for effective schooling Therefore, how the principals of marginal or low performance can further develop their leadership in these five aspects would be an important agenda.

Need for School Improvements According to teacher perceptions, 95 per cent of the sample schools needed to improve in different aspects of school functioning such as parental support, quality of student input, instructional resources, physical environment and facilities, staff professional development, morale, student performance, decision participation, teacher appraisal, and administrative procedures and management The finding suggests further development of the sample schools even though a number of them already have very good performance in different areas.

Recommendations on Using the Profile

Some recommendations on how to use the mapped education profile for development and accountability should be provided to the concerned school practitioners or policy-makers. Mainly based on the purpose of facilitating organisational learning and development in the above study, the following recommendations were proposed for those concerned to enhance the education quality of the sample schools in this study.

1 *Understanding and Discussing the Findings* The sponsoring body, the school management committees, the supervisors, the principals, and senior teachers may first read the report carefully, clarify the information, and validate the findings, and discuss the doubtful points (if any)

2 *Reflecting on the Quality Profiles of the Schools* They may further reflect on the characteristics of the quality profiles of the sample schools and classes and the implications that the researcher has listed after describing the characteristics of each indicator

They may identify those areas (not necessary all the researcher pointed out) most significant, prioritise them, and plan to do something on them If necessary, they may investigate further these areas. (The basic information and the histograms of indicators in the appendices may also be helpful for discussion and reflection.)

Each school should use the profile of education quality of its own school to compare with the overall profile and reflect on its strengths and weaknesses.

It is strongly recommended that they should involve their teachers to reflect on their school profiles.

Reflection on the quality profiles is a necessary step for staff (including administrators) development and school development planning

3. *Planning Development Actions:* According to their own reflection and the above listed implications of the findings, the sponsoring body, the principals association, and the individual schools may have different perspectives to plan development actions The sponsoring body and association may have broader perspectives and their plans may have a target of more schools. The school administrators may focus on their own schools.

They may consider to encourage participation of those concerned in formulating the development action plans.

School development inevitably includes development of principals, administrators, and staff as well as the social, psychological, and physical aspects of school environment Therefore, a balanced, realistic, and long-term plan may be necessary

4 *All Information should be used mainly for the purpose of Learning and Development.* They should make every effort to ensure that the findings and profiles are used only for the purpose of learning and development of the schools, administrators, and teachers.

Using the information for other control purposes (e g., administrative evaluation) should be very careful because it may create self-defensive mechanism or interpersonal conflicts that certainly hinder any positive learning among administrators and teachers

Establishing an open and supportive climate is very important for effective learning from the above information.

After the research, the author had written a report and conducted a seminar to explain the findings and help the managers of the sponsoring body, school supervisors, principals, and vice-principals to understand and use the profiles of education quality in school improvement and development The response from the participants were very encouraging. They found the profiles very helpful not only to the sponsoring body in formulating policies to help the schools but also to the individual schools in planning school-based development.

Limitations of the Study and the Framework

The above study was mainly on the information provided by the key actors in school—principals, teachers, and students. Other important school constituencies such as parents, school management committees, the school sponsoring body, and the Education Department had not been surveyed. Of course, this sets one limitations to the findings of the study Even though a rather comprehensive set of indicators at multiple levels including the student individual/class levels, the teacher individual/group levels, and the school organisation level had been conceptualised and used to describe education quality of the sample schools, it does not mean all aspects of school process and education process had been included For example, curriculum, teaching methods, staff development, community relations and services, school-home relations, etc, had not been investigated With the constraint of resources, inevitably every study has its limitations. If we accept that education quality reflects the overall performance of school members at the individual level, the group level, and the organisation level including affective, cognitive, and behavioural components and can be indicated by the satisfaction, perception, and performance of students, teachers, and principals, the findings of this survey can provide us rather comprehensive information to further develop the schools, administrators, teachers, and students. Of course, the framework can be further developed in future in order to redress these limitations

CONCLUSION

How to monitor and enhance education quality in schools is a major concern in current education reforms in different parts of the world. There may be many approaches to monitoring school education quality. In the light of the recent trend of education indicator development and the advances in school effectiveness research, this paper develops a framework including multi-levels and multi-indicators to assess education quality in schools. The framework is more concerned with process characteristics in school and the selection of multi-indicators is supported by research evidence from the past studies and the pilot study It assumes that education quality in school can be indicated by the overall performance of school members at the individual level, the group level, and the organisational level; the affective, cognitive, and behavioural components of performance, and the satisfaction, perception, and performance of the key school actors. Since the framework is rather comprehensive covering a wide range of indicators on major characteristics of school process and outcome, it can be helpful to monitoring education quality and improving school effectiveness.

The successful application of the framework in monitoring education quality of a sample of Hong Kong schools provides an example showing that the framework is feasible and useful and can serve the purposes of both internal development and external accountability. Furthermore, the development of framework is based on the literature not only from the Western societies but also from the Eastern regions, therefore it is hoped that this framework can contribute to the growing public concern, policy discussion, research conceptualisation, and practice on education quality and school development in both local and international contexts

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How Preschool Children Understand Written Texts?

Erik Hakonsson

In order to develop a method programme for a classroom research project the researcher must make a series of decisions. Since many of these decisions might influence the entire project, they must be connected to the basic ideas of the research In addition research of controversial issues also often demands that ideological decisions should be made by the researcher Finally a complicated research topic very often requires application of a combination of methods.

This paper presents a series of discussions in correspondence with a research project concerning preschool reading In this project quantitative and qualitative methods were combined

This paper does not state standard solutions or prescriptions for doing research. It should rather be seen as part of the preparation of a research project.

INTRODUCTION

This paper describes a series of discussions of methodological issues that were to be taken care of in a complicated research project concerning preschool reading.

Since the focus for this paper is methodological issues, I will pay little attention to other aspects of the study although these could be of importance in another context. Nevertheless, a background for the methodological discussions is given.

Many of the questions raised in the paper are left unanswered. On the contrary, the paper emphasises the importance of the researcher reaching his own solutions It is therefore not important that you agree with my dispositions.

The process started in 1989, when I was a guest lecturer at the University of Parnambuco, Recife in the north-eastern part of Brazil.

Some of my students were primary school teachers and they very much appreciated the work of Emilia Ferreiro which describes the way young children approach acquisition of reading and also emphasises the language abilities in preschool children.

I was already familiar with Ferreiro's work and as my students were so fascinated with it, we decided to do a study based on some of her ideas In this study 60 children 4-6 years-old were interviewed to assess their abilities to derive information from written text in their everyday environments The children were so-called street-runners, meaning that they lived in the streets, and had very vague family relations They had to take care of themselves for most of their needs.

My students got in touch with the children and while walking around in the streets with them, investigated how the children interpreted street names, labels on bottles and packets, names of stores, etc

The surprising results were that these children were rather competent in using the information they needed from texts Every child was given 10-20 reading tasks In 95 per cent of the cases, the children derived useful information from the text with 55 per cent of the answers being totally correct, and 40 per cent showing reasonable guessing taking place An example of this could be that they said "toothpaste" for "Colgate" or "Beer" for "Carlsberg" They also could explain how they got to their answer.

Primarily this study did not meet standards of a serious research project. The results, however, make me curious about the phenomenon as I wondered how Danish children would master the same tasks.

When I returned to Denmark, I therefore organised a similar study though modified in the aspects of control of the procedure At this point I faced one of the most important problems in research involving human beings, namely the BIAS problem

My Brazilian students were very fascinated by the idea that the preschool children could read In fact, I suspect these teachers migh unintendedly have helped the children to peform even better They might have made a too positive interpretation of what the children said, or they might even have been unaware of giving the children small hints. In a way they, therefore, could have manipulated the process to get the results they wanted.

STEPS TO SOLVE THE PROBLEM

1. A standard procedure was developed to ensure that the children were questioned in a way that did not implicitly give away the answer It was, however, impossible to formulate the questions because it had to be anticipated that each child would have different experiences and background knowledge Anyway, a technique was developed to investigate

which words the child might recognise, the strategies he or she might apply, and the source of the child's knowledge

2 A setting for the interviewing process was established As the children lived in different locations it was difficult to know where it would be most likely to find a source of relevant words. I decided that he interview could take place in a supermarket because they can be found everywhere and they have a standard assortment of merchandise. In a supermarket you will also find a great variety of words

I was well aware of the fact that with such a setting, street names were not included This could be of importance becuase especially street names are important signifiers for those who have to find their own way in the streets

I did not know what would be important signifiers for Danish children, but since Danish children are experienced consumers, I thought a supermarket setting would work for them

3 The interviewers were chosen among students who knew only little about the Fereiro Research and they had at least formally no ideas about children's early acces to reading. I estimated that would make them neutral observers. Also they had a short course in interview techniques.

4. As a child's responses to an interviewer might depend on how well it knew the adult I decided that this time the child should be interviewed by an adult he was slightly familiar with It could neither be his parent nor his teacher but another teacher from the same school would be appropriate. So I decided to use such teachers as interviewers. This was also convenient solution because I was in touch with many teachers.

5 Getting in touch with children of similar age as the Brazilian ones is very difficult in Denmark Nursery schools are separate schools in Denmark and people who work there have no connections with research So it would be very inconvenient to use 4-6 years-old children to test the research procedure But in the Danish schools 5-6 years-old children normally attend Kindergarten classes in the school so this group would be much easier to have access to

A study was then made with 100 Danish children of the age 5-6 to see how they would perceive texts in supermarkets This was done in 1989-190.

The bias problem was dealt with by some decisions that were not really objective or neutral and another problem occurred. The problem of selection Could these children represent a Danish population?

RESULTS

I expected the Danish reading results to be better than the Brazilian results The Danish children live in a Welfare Society They are well cared for and can trustfully investigate their world. The Danish children were older than the Brazilian children and they were supported by a good family life.

The results were not what I expected. The Danish children made a much poorer performance than did the Brazilians Only 45 per cent gave good answers and out of these, only 25 per cent were reading correctly But more astonishing, many of the Danish children denied to answer the questions. They had the option that reading was something the teacher would teach them when they started school. It was not of their concern to think anything about the texts around them. From this experience we could see that the attitudes and social norms became important factors.

Although these two pilot studies can be very easily criticised, on the research procedure they raise a series of questions that the following study had to deal with, and they can be seen as my personal background for the next work.

First I will describe the social background and the research background and then I will try to discuss some of the methodological aspects of the work

The Project.

HOW PRESCHOOL CHILDREN UNDERSTAND WRITTEN TEXTS

The project was organised in cooperation with The University of Pernambuca, Recife, Brazil; The University of Montana, Missoula, Montana, United States; The Pierre Mendes France University in Grenoble; and The Royal Danish School for Educational Studies, Arhus, Denmark.

During the period September 1992-December 1994, 130 Danish children, 107 American children, 77 French children were observed and interviewed in drawing, writing and reading situations This was done either by Erik Hakonsson or by assistant researchers.

Background

Since significant relationships have been observed between positive reading attitudes and achievement gains in school-age children, parents and teachers need to help young children to develop favourable attitudes toward reading. Attitudes acquired by children during their early reading instructions and reading experiences strongly influence their later reading (Heilman 1972).

Positive reading attitudes in young children are developed as a result of positive early reading experiences. Therefore, we must not doubt the importance of these early reading experiences (Ellermeyer 1988)

While attitudes towards reading are important, their measurement has been neglected Young children assume an active role in learning written language. Since young children grow up in a literate society, they become aware of prints on billboards, storefronts, street signs, road signs, television commercials, package lablels, etc.

When exposed to a literate environment young children develop ideas about his cultural phenomenon long before formal reading instruction starts. They wonder about the observed phenomena, ask the most difficult-to-answer questions and they construct and test their own theories about written language. Not yet knowing how to read does not prevent young children from developing precise notions about the features written language must possess in order for reading to occur (Ferreiro and Teberosky, 1979).

Current research evidence supports the notion that very young children react to written language in their environments. Hiebert (1981) reports that three-, four-, and five-year old children simultaneously acquire both general and specific information about print in the world around them She examined patterns of interrelationships in children's development of print awareness during the preschool years and found that while some of the young children performed well in all measures, all, including three-years olds, knew something about print

The profiles of the different age groups in Saracho's (1983) reading study showed that three-year olds were beginning to develop definitions, categorise their thinking and test their ideas, four-year olds made inferences through classifying, comparing and synthesising various dimensions as well as analysing incidents into an organised meaning The five-year olds made inferences by defining their own terms, testing their own ideas and comparing characteristics as well as synthesising these inferences to draw conclusions

The results from the three-year olds provided evidence that they had proficiency in letter naming, visual and auditory discrimination as well as a degree of understanding of the processes and purposes of using print.

Although these roots of print awareness were found among three-year old children, knowledge of print awareness increased significantly from the beginning to the end of the pre-school period. The performance of the five-year old children were significantly better than those of the three-year-old children on all measures The results indicate that the early part of the pre-school period is a particularly active time for print-related learning.

These studies indicate that young children recognise print to be meaningful within familiar, contextualised settings Goodman and Goodman (1979) content that the acquisition of literacy is extended from natural learning for all children The children's awareness of print and its purposes may guide them naturally to participate in reading and writing Therefore, to facilitate learning, instruction needs to be consistent with this process

Also earlier works by Downing (1969, 70, 73, 79, 82) and many others indicate that when assisted by the context and understanding where the text contains relevant information, preschool children are often able to guess or deduce the message in a very rational way

Several research projects have focused on preschool children's interest in the structure of a text when adults read aloud for them (Dahlgreen and Olsson 1985, 1993).

At the same time there has been an increasing interest in children's attempts to create their own writing It is called "invented writing" or, in this paper, "play-writing." In the early thirties Celestin Freinet described examples of this phenomenon and after the publication of the work of E. Ferreiro (1975, 1983), other researchers (E. Grossi, 1989, B Eriksen Hagvet, 1989) have investigated children's experiments with the writing process

Significance of the Theme

Results and conclusions from the above mentioned projects have already had a significant influence of primary school and preschool activities.

Nevertheless, many teachers do not take into account the potentials of preschool knowledge. They tend to teach reading as if the children start from scratch. And it is also evident that the way reading is taught plays an important role for the possibilities to realise these potentials in a way useful for the children.

Within the research of reading two different approaches to reading and reading accquisition have continuously been discussed. The two approaches are sometimes named "Bottom-up Approach" and "Top-Down Approach," often also called the "Whole Language Approach."

The first mentioned Bottom-up Approach stresses that children should learn the letters first, then combine the letters to construct words and then little expand the basic knowledge of letters and words to make text-reading possible. Spelling is therefore a prerequisite for reading, knowing the letters and how they sound are the first steps in the acquisition process. Reading is defined as a process connected to the decoding of letters What goes on before the child starts decoding is not seen as reading In such research prereading is often called "pseudoreading."

The other approach, Top-Down, stresses the understanding of content and meaning as the main idea of reading Therefore the acquisition must maintain the idea of communication Teaching reading starts with messages that the children can read or guess the meaning of. The components children encounter when taught are words, sentences and utterings in a context that helps them identify the message. Work with individual letters is a later step. Reading is defined as a process of extracting meaning from the text Identification of every single letter is not important The acquisition of reading is seen as a part of the natural development

Analysis of these and many other appraoches (Hakonsson 1989) shows that behind the discussion lie different ideas about both the reading process and the learning process In the two approaches mentioned above the research results will have very different significance and consequence

In this paper reading is seen as an information extracting process and the objective of this project was, therefore, to collect information about important factors in preschool children's development of prereading.

In order to change this rather broad formulation into a more precise and more testable set of hypotheses, a series of questions had to be answered

1 What is the relation between the educational tradition and children's interest in understanding a text?

In Denmark it is a tradition to avoid reading encouragement until a child starts first grade In the United States and in France the attitudes are different There children are often invited to work with letters and words already in nursery school. The traditional Danish attitude is widely discussed in Denmark at this time.

2 The significance of texts in the environments varies with the geographical location. In Denmark foreign television programmes are shown in their original language with Danish subtitles. To understand a movie you must be able to read the subtitles. Could this be a significant factor ?

3 Is there a connection between the phonetic structure of a language and the acquisition of reading ?

In some languages the pronunciation of an individual letter varies greatly depending on its position in the word. That is why one cannot get to the word by simply sounding out the letters Only when you have actually read the word will you know the sound of each letter. English, French and Danish represent such languages while Sapnish is more phonetic.

4. Is it possible to identify some natural stages in children's approaches to written texts?

As has been mentioned the children's play-writing can be of importance for their reading expeiiences. Ferreiro (1975, 1983) defends the existence of a predetermined series of stages in this development. But her research fails to account for the teaching tradition or the structure of the language.

Many other interesting questions could have been consdidered but the research programme had to be narrowed down to a more modest aim and procedure.

Objectives of the Project

It has been stated that most young children acquire familiarity with words and textual information during their daily life outside school It has also been stated that children take initiatives to approach writing and reading through graphic activities.

Therefore the objectives of the project should be to

a) identify significant factors in this early reading/writing process
b) examine to which degree a child's development in graphical performances (including play-writing) corresponds to its emergent ability to read.
c) examine the significance of certain socio-cultural factors for this process.

THE METHOD

This research combined a variety of methods.

First, investigations in the three different cultures were organised

Children were selected from middle-class areas in Denmark, the United States and France. The rationale for using the middle-class level was a need for working with children who had similar access to texts and who came from families with a norm of caring for their children.

The rationale for using the three specific countries was to work with languages with similar correspondence between written and spoken language But it was also taken into account that I have a reasonable competence in those langauges

That was the way we dealt with representation problem.

Then the general research procedure was decided

Graphic Representation

We wanted to observe and interview the children to get an impression of their graphic expression when they worked in a familiar environment. We, therefore, spent a few days in each classroom to get acquainted with the children before the systematic research began. The classroom investigations had to take place during regular school days, and only when it was convenient for both the child and the teacher We wanted to avoid the feeling that the child is excluded from other interesting activities

In addition to having the children perform specific tasks for our research purpose, we also scheduled interviews with the teachers who then provided us with more examples of the children's work

Reading

As the children bacame familiar with the researchers, they were taken, one at a time to a nearby supermarket for the purpose of finding words they could interpret or read.

Results

In this way the research data would consist of

- recordings of the interviews
- quantitative date about the children
- samples of the children's play-writing and drawings
- organised interpretation of the answers and expressions we got from the children while working with them

Elaborations of Method

In order to collect valid understanding of the process a more precise procedure had to be elaborated The first step was to change the mentioned problems to more measurable or testable hypotheses.

The following statements were formulated to be tested

1 Preschool children's reading is dominated by contextual reading and "logo" or whole-word reading They recognise primarily words that have a function in their everyday life They will also be able to recognise words and logos they encounter on television etc

2 The encouraging attitudes found in both the United States and France make these children more competent contextual readers than Danish children

3 There is a positive correlation between children's use of letters and words in drawings and their contextual reading competence

4 Because of the difference in adults' attitudes towards early reading, preschool children of the mentioned cultures show different approaches to interpreting texts

5 Children who are engaged in making graphic representations perform better in writing and reading tasks

At this stage of the research there were additional aspects to consider, so I reworded the formulations to clarify what I really wanted to know

A. Concerning play-writing

1. Do the children play-write? In what connections is it done? Which children do it? How many of them do it?
2 What characterises play-writing? Ferreiro has stated a 4-phase theory. Do they act according to that theory?

One could imagine that the children know that they are not really writing. May be they know they are pretending. Will that make a difference?

3 Do the children write letters ? If so, what meaning do the children give to the letter they write?

B. Concerning the children's reading

1a Which words can the child read correctly in a well-known context?
1b. Which of these words can the child read outside the context?
2a. Which concepts can the child guess rationally from the contextual word?
2b. Will the child make the same rational guess if it sees this word outside the context?

C Concerning the correlation between reading and writing

Does the child's ability to read both in and out of context correlate it ability to play write?

D. Concerning cultural differences

Do differences in the cultural tradition and attitude correspond to differences in the children's reading and writing performance?

To measure a child's abilities in the three dimensions, drawing, writing and reading (at this level), a theory and an instrument for measuring had to be developed.

The background for the construction of these models is connected to theories that are not mentioned here. Some readers will recognise the classical attempt made by Goodenough and others.

What I needed was a rather simple scoring rubric that would produce the same results when used by different people This is another attempt to solve the bias problem.

I call this instrument "Models for Scoring "

MODELS FOR SCORING

The numbers correspond to the points given

Drawings

0 Not using distinctive forms Scrawls.
1, Elementary forms like closed figures, dots and lines representing different things when the child tells about it.
2. Crude elements with recognisable forms.
3: Recognisable elements with crude and rough details like hands with less than five fingers etc.
4: Many instructive details like ears on a person and wheels on a car.
5: Specific details showing knowledge of the object like buttonholes, flowers on a hat, etc
6· Combinations of figures displaying a situation
7· Greater perfectionism like the persons using tools
8-10. The drawing is estimated extraordinarily advanced

From level four the drawing can be identified by someone other than the child itself as a message about something specific

Writing

0 Real writing is not used. Play-writing is recorded by comments.
1. The child uses single letters not necessarily shaped correctly.
2. The child uses letters in combinations such as writing its own name.
3. The child writes letter-combinations and give a clear explanations of the meaning This can be considered to be the first step in "invented" writing
4 The child writes words and combinations of words mainly using same form of phonetic spelling.
5. More advanced word combinations
6 The child writes phonetic words with correct spelling.
7 The child writes non-phonetic words with correct spelling
8. The child writes phonetic and non-phonetic words with correct spelling
9. The child writes in full sentences,

From level 2-3 the child must be considered aware of the function of letters.

Reading

0 The child does not respond to a text as something meaningful. Makes no attempt to guess the meaning
1. Guesses in a deductive way. Uses commonsense and the context to deduce the message. The child may say "Toothpaste" looking at the Colgate-logo.
2. The child focuses on symbolic representations which is relevant when it makes its deduction Points for instance at "Kellogs" and says "Cornflakes."
3. The child focuses on the correct individual words by pointing to them.
4. The child identifies and uses individual letters as a support for naming the word. The child might say. "I knew it was Cornflakes because I could see the C."
5. The child identifies the syllables in the correctly identified words.
6. The child reads a short message with comprehension.
7. The child reads longer sentences.

From level 2-3 the child must be considered aware of the function of words. From level 4 they must be able to understand the function of letters.

These scores were constructed after long discussion with the group of researchers Works by Sundblad et al (1985) were used as background. The difficulties arise when considering the fact that the children's developmental levels do not always follow the steps in the scale. The so-called scale-interval-problem was also of concern.

When establishing a scoring rubric each interval on the scale should have an equivalent progression. Like in the meter-system, the distance between 78 cm and 79 cm is exactly the same as the distance between 13 cm and 14 cm the size of each step should correspond to the same standard. If not you can only use the scale as an illustration but not for calculations of average etc.

In our case the scales were tested against some of the accepted and standardised test-batteries in Denmark while it was not possible to compare them to tests in the two other countries.

Nevertheless, we were confident that we had the necessary instruments for our project.

The Results

In this paper I will mention only a few of the results that can illustrate some of the methodological issues.

First it must be mentioned that some of the expected results did not occur at all. Play-writing was observed only in very few cases. The interviews showed that many children were well aware of the fact that they could not write properly and therefore would not pretend that they could They preferred to show only the letters and forms they actually mastered. Some of the children offered to act as if they wrote and in such cases we got expressions very much like the ones in Ferreiro's studies but the general impression was that "invented writing" was a rare occurrence

It also became evident that the children could use their drawings as representations for much more sophisticated phenomena than the ones they actually could draw They did not try to make a drawing look like the object it represented if the figure functioned in the form they gave it

With this kind of inside knowledge within the creative process it became problematic to interpret the final drawing as a measure of the child's ability.

Similar problems were experienced during the interviews assessing the reading abilities. The interviews produced information that problematised the models for scoring If you, as a researcher, are in the middle of the practical process you might learn, that what you anticipated does not happen in the way you thought it would You might even realise that your not-to-be-mentioned experiences can influence the whole project

Regardless of potential errors we interpreted the performances with the mentioned models for scoring and actually got some interesting results out of it.

When comparing the average score in drawing, writing and reading it became evident that the American children had a higher score in all three dimensions

Average	Danish Children	American Children
Age	70 60 month	68 85 month
Drawing Score	2 86	6 85
Writing Score	1 74	2 53
Reading Score	1 26	2 06

Figure 1 Average scores for Danish and American children

Another score of certain interest is the rélation between reading and writing. According to the theory the results should be related.

Writing						
5						
4				1	1	
3		3	9	4	1	
2	1	20	29	7	3	
1	2	12	7	3		
0		5	5	3	1	
Drawing	0	1	2	3	4	5

Figure 2 Danish children' drawing and writing compared.

There appears to be a vague correlation between some of the results, i.e., many children are at the same level in the two dimensions. But almost as many are not at all. This provokes some new reflections.

Interpretation of Data

Since Galileo's time there has been a tendency to think that what can be measured and expressed with numbers is closer to the truth than that which can only be described and explained in words. Therefore researchers tend to develop general standards. This seems to clarify the organisation of results as long as only few factors are involved

When doing reading research, it is difficult to understand a child's learning process unless many factors such as attitude, motivation, intention, and former experiences are considered

As seen in the Piagetian approach, the constructivism, many of these human aspects are influenced by the surroundings in a way that make them very difficult to measure. A child can, for instance, be very competent when working with one person and very incompetent together with someone else. You must therefore ask whether your research objective can be treated within a scientific framework or not.

The collection of information in this research project consists of.

1. Quantitative Data

Collecting quantitative data that can be easily measured such as the child's age, the number of letters used, and number of words correctly identified can be objectively carried out by different people if they are properly instructed.

It is a simple task to measure a child's age but when it comes to evaluating its maturity level the task becomes much more complicated.

Two children who are both 72 months old are not necessarily very much alike Likely, two children both knowing six letters are not necessarily at the same level to understand the meaning of letters Therefore, even the most neutral and objective data must be interpreted with care or they might not produce valuable information

2 *Qualitative Data*

Qualitative data are interpreted without the use of numbers and figures. Commonly, qualitative data include interviews where you seek information through spoken and written language. The objectivity is problematic because of the ambiguity of language.

The data may also consist of interpretations of other material such as drawings, paintings, etc. Again the ambiguity raises doubt about the objectivity.

Interpretations of a child's creative expressions like their drawings or their reasonings might arrive from a conversation with the child. The conversation process is rather fragile. Most people tend to be somewhat subjective when interacting with other human beings. This is part of the trust Much depends on the adult's empathy with the child and the child's confidence with the situation in which the conversation takes place The significance of establishing a situation in which the child is comfortable cannot be underestimated

Interpretations of the children's behaviour while they were drawing or looking for cues in the stores must be accepted to be subjective to a rather high degree. On the other hand, it is through empathetic understanding you get close to other people's way of thinking

3 *Application of Quantitative Measures to Qualitative Data*

In this study we tried to apply quantitative measures to qualitative data which is a difficult and sensitive process. The measurements must be valid, show the criteria you are looking for, and be replicable (reliable) The point is that when you transform expressions from their original human form into unambiguous numbers, you are already interpreting. This interpretation might be disguised by the clarity of your figures, but it is still there.

Therefore you are required to explain how you transform your qualitative information into quantitative data. Very often you need a theoretical rationale to support your transformation In this study, three different researchers interpreted the same materials to avoid a biased result. Only if they reached an equivalent score with an allowed margin of error were the results included

Closing Remarks

In this paper I have attempted to provoke discussions about the ways we transform qualitative phenomena into quantitative data

During the work you might experience that the more personal subjective interactions with the children in the classroom while working with them are much more valid to you as a researcher than the mere objective data you collect. Nevertheless an objective of research must always be to make subjective understanding transferable to other people. Something get lost in the transference but other aspects are gained Therefore both the benefit and the disadvantage must be considered when research experiences are mediated to the schools and the teachers.

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Changing What Happens in Schools: Central Government Initiatives to Improve School Level Practice

David W. Chapman and Lars O. Mählck

While many countries are expressing a renewed commitment to improving the quality of their education system, the move from commitment to action has been harder than expected. The education systems of most countries are highly centralised and decisions about how quality should be improved are often made many levels away from the classroom, where the real process of education occurs. *What can ministries of education do at the central and regional levels to influence practice at the school and classroom levels?*

This paper summarises key findings of a series of eight case studies of national efforts to implement strategies that have been widely advocated as ways that central and regional education ministries can influence education practice at the school level. These case studies identify the types of cross impacts, unintended consequences (both positive and negative), and practical problems of implementation that provide the basis for assessing the potential of these strategies to actually influence classroom practice. Secondly, the case studies suggest the kinds of information education planners and administrators need to be able to successfully undertake these actions Informations has emerged as the new currency of development. Too often, however, in the zeal to improve the information base needed for planning and programme implementations, countries have created a state of *infoglut,* with education planners strangled by more information than can be meaningfully analysed or used, yet still

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The full text of the case studies summarised in this paper will be available in late 1996 in Chapman, D W, Mahlck, L O., and Smulders, A. (1996) *From Planning to Action. Government Initiatives for Improving School Level Practice.* UNESCO. Paris. International Institute for Educational Planning without the essential information they need to make the types of decisions they face.

The study for which these case studies were developed was jointly sponsored by the International Institute for Educational Planning (IIEP) in Paris and the Advancing Basic Education and Literacy (ABEL) project funded by the United States Agency for International Development (USAID). IIEP, established in 1963 in Paris by UNESCO, promotes training and research on educational planning in relation to economic and social development. ABEL is a ten year project (1989-99) to assist governments in planning, policy research, and implementation of interventions to improve access, quality, and efficiency of education. The project is operated by a consortium of 15 international development organisations led by the Academy for Educational Development in Washington, D. C

IMPEDIMENTS TO MINISTRY IMPACTS ON SCHOOL AND CLASSROOM PRACTICE

The purpose of an education ministry is to organise and guide school practice. That may be harder than it sounds. Educators at the school level may resist external guidance sometimes from a belief that they know better what will work in the classroom than those at more central levels of the system, sometimes from a fear that the ideas coming down will have negative consequences for them personally. In some countries, educators point out that they don't receive the message about what ministry planners expect of them—sometimes due to poor ministry-school communications channels, sometimes because the message itself is fuzzy and the meaning unclear. Regardless of the source of the problem, the impact is the same. Central policies and programmes often do not get implemented, or do not get implemented in the way they were intended. Nonetheless, while impacts may be the same, the ability of a ministry to take corrective action requires a clear understanding of what constraints are operating Five factors are often cited as causes of the problems ministries have in influencing school and classroom level practice.

Ministry policies never get communicated to the schools Headmasters and teachers don't even realise they are supposed to be doing something different.

Education in many developing countries is a loosely coupled system, characterised by poorly defined allocation of responsibilities, a mismatch between the organisational chart and unit activities, jurisdiction ambiguities, redundant operations across unit, slow or absent coordination among units, and conflicts between unit over control of programmes and resources (Negel and Snyder 1989, Weick 1976) Ministry officials responsible for formulating policies and programmes may not have any responsibility to ensure that those policies and programmes are communicated to school personnel

The policy is communicated to the schools, but in such vague terms that school personnel do not understand what actions they are supposed to take They either implement the policy incorrectly, or do not implement it at all

Consensus is easier to reach when policies are formulated at higher levels of generality. The ambiguity allows participants to agree on otherwise controversial issues, since it allows each to interpret the policy in terms most favourable to their own position Problems of meaning are deferred to the implementation stage, and often shifted from the policy-maker to the implementors The absence of shared meaning only emerges when specific choices and concrete actions define the real intention of a policy or a plan. Implementation then falters as latent disagreements surface, disagreements that were glossed over in the policy pronouncement.

The policies and programmes coming from the ministry are seen by teachers as inappropriate and out of touch with the realities of the classroom

Teachers may choose not to implement policies and programmes with which they disagree For example, some teachers feel that more active student participation in learning (peer work-groups, student projects, more student questions) undercuts the teachers' authority in the classroom. Despite the suggestions that more active student participation can improve student learning, many teachers refuse to introduce such methods on any sustained basis. Similarly, some cluster school programmes have failed because secondary school headmasters resisted working with primary teachers in their school cluster.

The actions expected of teachers to implement new policies and practices place demands on them that they are unwilling to meet

The costs of implementing a new initiative do not always fall on those who reap the benefits. Virtually every innovation, especially in the early stages, makes new demands on teachers, requiring them to learn new things, teach in new ways, or modify their classroom practices in ways that requires time and energy. The "worklife complexity" hypothesis suggests that teachers (like most everyone else) will tend to resist those innovations that make new demands on their time and energy, especially, if responding to those demands means diverting time and energy from other activities which they value (such as a second job or time with family).

For example, adoption of a new curriculum may offer long-term benefits to the ministry (in terms of higher levels of student achievements) while having short-terms costs to teachers (in requiring them to spend additional time for class preparation) This cost to teachers may result in their failure to implement the new curriculum, not because the curriculum was weak, but because teachers lacked adequate incentives.

Seemingly good policies interact in negative ways

Interventions desinged to correct one problem sometimes create other problems, some more severe than the original one. These cross-impacts were either not anticipated or were selectively ignored during planning. Consequently, good educational programmes fail, not because they were poorly planned or implemented, but because outside events had unanticipated impacts on the programme. These unanticipated impacts occur because education menagers were not aware of how activities in other areas of the education system affect the programmes for which they are responsible. A (true) example·

> The Ministry of Education sought to strengthen its management capacity by implementing a national education information management system. School data were collected from virtually all schools in the country, analysed, and made available to central level education planners The system worked well and was quite effective. Two years later, this data system collapsed. To compensate for a cut in governments allocation to the education sector, the Ministry of Education implemented school fees at the secondary level Some schools, also caught in the budget shortfall, diverted a portion of those fees to cover instructional materials and school maintenance. In response, the Ministry used the enrollment data from their new information system to ensure that fee payments were received from each schools Within a year, most schools were either under-reporting enrollment or not reporting data at all. Without data, the system floundered The decision to collect school fees had a negative impact on an earlier government effort to improve its collection and use of data for decision-making

LESSONS FROM THE CASE STUDIES

Each of the eight case studies, examine a different strategy through which education ministries might influence school and classroom level practice. These case studies report efforts to improve school practice through:

1. better use of information systems to support progamme management,
2. decentralising information about the education systems,
3 increased community participation,
4. curriculum development,
5. improved teacher education,

6. textbook revision,
7. the use of multigrade classrooms, and
8. the use of national testing

These case studies are not offered as exemplars of how such interventions might be undertaken—not all of these efforts worked in the way they were intended. Some did not work at all. Rather, these case studies document the opportunities, issues, and problems encountered in ministry efforts to influence school and classroom practice Each of the case studies offer important insights to those who seek to improve school level practice Key issues addressed in these case studies are summarised below.

Improving School Practice Through the use of Information Systems

Weak management capacity is often cited as a reason central governments is unable to influence practice at the school level. This weak capacity is due, in part, to the lack of timely and relevant information that could better inform decisions on such matters as teacher allocation, textbook distribution, and school budget Better information, the arguments goes, could help improve the learning environments within the schools as educational resources are better allocated.

Unfortunately, the history of education management information system (EMIS) development over the last two decades has not always supported this argument. The rush to develop EMIS to strengthen management capacity has often had the opposite result Too often more data were collected than could be analysed or reported in a timely manner. The lack of timely information was interpreted by senior officials as evidence that not enough data were being collected. However, as more were then collected it exacerbated the problem of analysis and reporting More date further clogged up the system And the cycle continued.

As educational planners and EMIS managers grew more sophisticated about the role of information in decision-making, many argued that the limited impact of EMIS systems was caused by top levels of governments holding the data too tightly and trying to make too many of the allocation decisions centrally. The way to unclog the system and, at the same time, increase the impact of data on school management was to decentralise data access and analysis to administrative levels closer to the school, closer to those most directly in a position to use data. If decision- makers had better information available to them, advocates argue, they could do better at resource allocation, planning, and programme management. The change in resource flow to the schools should result in better educational experiences for children in classrooms

But the promise has not been realised Computerised education information system in developing countries have informed, facilitated, and justified administrative decisions, plans, and policies at the national level but, in spite of their rapid expansion, they often have had little or no direct impact at the school level.

In a case study set in Indonesia, Don Adams and Boediono identify five reasons why EMIS has had little impact on improving school practice (a) The choice of indicators gives low priority to information on classroom process. (b) Basic educational concepts, such as quality, are often unclear and subject to a variety of interpretations. (c) Teaching and learning are complex processes and not readily "transparent." (d) Classroom dynamics are time dependent; data systems can't respond fast enough to be useful. (e) Technology is context dependent—teaching methods that are effective in one culture may not be in another In short, information systems fail because the centrally collected information they provide is not closely linked to school level initiatives.

Information can have more impact on school practice, Adams and Boediono suggest, if it is put in the hands of those closer to the school Their case study, set in Indonesia, examines ways this can be accomplished. The authors suggest that there are two parallel flows of information that influence school practice. One flow, part of the *formal information system,* emphasises quantitative information and informs administrative decisions. The other flow is of qualitative information, more closely linked to the teaching-learning process, and frequently part of the *informal communication process* within the school The authors argue that there needs to be a way to link the formal and informal information flows.

One possible link is through greater community level involvement in school management To this end, Adams and Boediono look at how information can be used to strengthen community participation in education and, additionally, how local participation can help in the interpretation and utilisation of information for school improvement They analyse Indonesia's efforts to progressively expand educational access to and use of quantitative information at sub-national levels of the Ministry. They present three case examples, *Example 1* describes information collection in the Directorate of General Secondary Education and the use of those data in identifying inter-school and regional variation in resource allocation—things like the misallocation of teachers. It is an example of central use of data for decisions about resource allocation at the sub-provincial level *Example 2* describes the growing role of the Provincial level administration in analysing and interpreting data at the provincial level to provide information to school principals on such things as cross school information on student achievement.

Example 3 describes the Community Participation in Planning and

Management of Educational Resources (COPLANER) programme, an exploratory initiative designed to improve local schools through community participation in educational planning Organised as a number of interlocking advisory and technical committees and groups at the national, provincial, district, and subdistrict levels. COPLANER was intended to improve local schools through community participation in educational planning Local Forums, consisting of 15-30 members, operate as developers of community involvement and as information channels to higher levels of the Ministry The COPLANER teams are a local user of the national and provincial data as they interpret local conditions into government policy

Their case study suggests that information can have more impact on school practice if it is put in the hands of those closer to the school At the same time, wider participation has a down-side. The increased local participation can slow the implementation process and provide an opportunity for opponents to dilute or obstruct change

Improving School Practice Through Decentralising Information About the Education System

Improving quality and efficiency at the classroom and the school levels suggests, at minimum, that those responsible for decisions that directly affect these levels have the information they need on teaching and learning conditions. One way to support this level of decision-maker is to capture and share information on classroom dynamics and the school environment using easily quantifiable indicators at the school level. Too often, however, central level planners (a) assume that compliance with national directives and rules is sufficient for improving educational quality and efficiency at all levels and (b) do not encourage local educational planning cycles involving a variety of stakeholders and supported by information on local context and school conditions

Kapur Ahlawat and Victor Billeh, in a case study set in Jordan, argue that local communities and individual schools hold the key to effective implementation of educational reform. The authors build their argument through a case study describing Jordan's efforts to increase the use of central ministry data to support micro-policy planning at regional, district, and school levels, and to devolve operating authority from the center to regional authorities and individual schools.

They trace the recent experience of Jordan in developing a decentralised EMIS. In doing so, they explore a central dilemma of EMIS. *To be of much help at a lower level, the data need to support micro-analysis This level of analysis requires that data be collected on individual students, teachers, classes, and subjects within schools But collecting so much data is extravagant and too* *much data can clog a system, leading to breakdown and non-use.* They point out that decentralisation within an EMIS is not just an expression of a philosophy (about wider participation in decision-making), it is a practical problem of too much data to consolidate Ahlawat and Billeh argue that a workable solution is to decentralise collection, storage, and analysis to keep micro-level data available to the schools and districts, with increasingly greater aggregation in the data that move up the system, to the regional and central levels

Easier said than done As the authors acknowledge, building the technical skills to support this decentralisation of information and decision-making is where most efforts fail In response, they document the efforts of Jordan to build local (e g , district and school) capacity, even in the face of a spectacular growth in the education system. In doing so, they describe the types of glitches they had to overcome to bring the data system to a point at which it could be used—first in developing a useable data base and then in decentralising it. They trace a series of very practical problems. For example, data could not be linked across years because school ID numbers changed each year; different Departments of the Ministry used different school coding systems within the same year, and, different types of data were kept in different formats, making it hard or impossible to combine them Data management was not the only problem Selection of trainees to staff the computer system was too often based on seniority or favour rather than on competence or prior preparation for the training

In presenting the Jordan case study, they also address the issue of supply driven vs demand driven EMIS systems. Supply side advocates of EMIS argue for lean data collection that only expands as there is a well defined demand. Others argue that the best approach to get a data system up and running is to create demand by first showing what the data system can do. Ahlawat and Billeh suggest that *EMIS development may be demand driven at the national level but supply driven at the local level* In the Jordan experience, highly visible, dramatic displays of findings helped convince skeptics Senior officials were intrigued by findings that ran counter to conventional wisdom and had major actionable consequences

The attention grabber in Jordan was the use of the EMIS to challenge a report which had concluded that there was already a sufficient number of school places to meet the demands of increasing enrollment without resorting to new school construction. The new data system provided a means of disaggregating data by regions Analysis based on the new EMIS system showed that rural areas had empty places while schools in urban centres were overcrowded and unable to meet the demand. This led to a two-part recommendation. In some remote, sparsely populated areas where there were partly empty school buildings, the solution was to open them for other types of community services or find some other worthwhile use of the available space In crowded areas, the solution was school expansion or new school construction Results using the new data system were more believable and more appropriate to the real problems facing people at the community level

Ahlawat and Billet attribute Jordan's success in introducing a new and more decentralised EMIS to the investment in training, gradual phased implementation, careful planning, the involvement of a broad range of education professionals, and the ability to produce some attention-grabbing analyses early in the process.

Improving School Practice Through Community Participation

One of the most widely advocated strategies for improving the quality of classroom practice is to give more authority and responsibility to those closer to the community level who, presumably, best understand local conditions and needs A large literature proposes that people-centred, participatory approaches are essential to achieving sustainable development. Central ministries can make the most difference by doing less Consequently, most recent national educational reform efforts involve at least some component aimed at increasing community involvement or control over their schools

Fernando Reimers presents a case study set in El Salvador of a community participation project that did not increase school quality as intended, and uses that study to consider the larger dilemma posed when new and presumably good ideas do not trickle down He argues that one reason for the resistance of educational systems to change is that information about programme results was not used to stimulate a process of dialogue that could further organisational learning

Reimers develops his argument through a case study of El Salvador's experience implementing the Education with Participation of the Community (EDUCO) programme, a community based programme in rural schools aimed at expanding educational opportunity The premise of EDUCO was that low student achievement in rural schools was due to teacher absenteeism and that teacher absenteeism could be reduced if parents could fire weak teachers The programme decentralised considerable authority over local schools to local community associations. It was expected that local control would lead to less teacher absenteeism which would, in turn, lead to more instructional time, which would show up as higher student achievement

In EDUCO the community associations hired teachers with one-year renewable contracts, paid the teachers, and managed a small fund for school supplies Central Government continued to set minimum teacher standards The associations were managed by an elected committee In practice, this was primarily parents of students enrolled in the school. Started in 1991, EDUCO spread rapidly By 1993, ten per cent of all rural students in grades 1-3 were enrolled in EDUCO schools

The promised improvements never developed. There were no apparent differences in student achievement or retention. Teacher absenteeism, the original impetus for the programme, was about the same between EDUCO and non-EDUCO schools. There were no differences in instructional time between these types of schools. And, there were no major differences in school or teacher characteristics. Overall, community associations had very limited impact on the organisation or function of the schools

The programme failed for three reasons *First*, the programme encountered resistance from teachers' unions which opposed teachers being hired by community associations Local hiring fragmented the relationship of the trade union with a single employer (the Ministry). EDUCO was also opposed by leaders in zones formerly in conflict. *Second*, teachers did not like community control Rather than improving teacher retention, the EDUCO programme had higher teacher turnover, attributed in part to teacher desire for the job security of a more traditional appointment. Further contributing to the turnover was the requirement that teachers had to be college graduates. Communities had to reach outside their local community for teachers, which resulted in few teachers living in the same community in which they taught Teachers often had to travel great distances to get to their worksite *Third*, community-based management did not get to the community. School-based associations tended to be managed by the principal, with community participation often limited to the board of directors and the rest of the community having little knowledge of the programme

How could such a seemingly reasonable idea go so awry? Reimers argues that policies did not trickle down because there were no conditions to facilitate dialogue among stakeholders. The process by which policies are defined and continuously negotiated among stakeholders is more important than the intrinsic merits of the idea. In EDUCO, some senior decision-makers attempted to alter school governance, but tried to do it by relying on a traditional top-down model of administration. The El Salvador experience suggests that top-down imposition of community participation may push community members into roles they do not want and are not ready to accept and that more active community participation may change the incentive system for teachers in ways that undermine teacher morale and foster organised resistance of teacher unions.

Improving School Practice Through Curriculum Development

Curriculum revision is one of the more direct ways central governments can influence what happens in the classroom. Changing what teachers teach changes what students learn. But *the way* curriculum is changed and the way those changes are introduced can determine the extent to which the curriculum is accepted within the school and community Consequently, educators increasingly argue that involving the community in curriculum development is important in building support for such changes. But how can communities be involved meaningfully in the curricular side of local schooling? Wheeler, McDonough, Gallagher, Namfa and Duongsa describe the model that has worked successfully in Thailand for bringing community members into the instructional activities of the school through a top-down initiative to encourage local community participation

The Thailand project was designed to teach environmental issues in a way that drew on local community expertise. Students focused their science studies on the causes and consequences of local environmental problems—such things as the shortage of firewood, soil erosion, and flooding These were issues of local importance, issues on which there was local expertise. The instruction involved communities in developing curriculum and delivering instruction about locally relevant issues. To collect data, students interviewed community members, some community members were invited to speak to the class.

But the learning worked both ways. The initiative did more than just promote innovative teaching strategies. It sought to build local capacity to respond to environmental problems, even as it was teaching students about the causes of those problems. While teaching science to students, these village studies helped communities understand the causes of local environmental degradation and participate in strategies to provide sustainable alternatives to local natural resource problems.

The Thai example presents a different model of in-service teacher training and a different view of teacher-community communications than is typical. This is not an initiative that bubbled up from below but a top-down "guided innovation" aimed at encouraging new forms of community-school collaboration around issues of local importance. The guided innovation operated at two levels At one level were the changes in schools and in the teaching-learning process as teachers worked with each other and with ministry officials to learn how to implement the community case study approach The second level was the development of the community school partnerships in which schools served as the source of technical assistance to the community on forestry issues that were determined by the community to be of local importance.

Early indications are that this approach has been successful Student achievement increased· students liked this new method of teaching The project improved community-school relations, both as community members came to better understand and value what schools were doing and as results of the class research yielded ideas that local community members found useful

The *top-down* aspect of the innovation is particularly interesting (given its apparent success), since most initiatives to encourage local involvement presume the importance of local participation in planning and design In the Thai project, school officials had a small role in designing the major components of the project or in site selection Schools could decline to participate, but community members had virtually no input in the design Nonetheless, early results indicate it is indeed possible to create conditions for local participation that are sufficiently appealing for teachers, students, and community members to want to become engaged in the project.

The project forced teachers and teacher supervisors into new roles—requiring them to make more individual instructional decisions rather than just relying on textbooks or policy pronouncements from Bangkok It required new roles for community members who were interviewed by students or asked to talk to a class session Finally, it required new behaviours on the part of school and district supervisors who were expected to give supportive assistance to teachers rather than just ensuring that rules were being followed.

While the project appears to be heading toward success and offers a new model of community-school collaboration, implementation is not without problems. Teachers and supervisors have different levels of enthusiasm for the new style of teaching and community members differ in their willingness to participate in school activities Teachers are concerned about the possible misalignment between the learning arising from this new instructional approach and student performance on the national school completers examination The Ministry faces the challenge of maintaining the distinction between a guided innovation and control. There is also the risk that, as communities and schools are sensitised to environmental issues, community members will join protests of government environmental policies which could result in loss of government support for this new type of instruction Despite these problems, this model offers a useful and potentially generalisable model for encouraging community-school collaboration within a framework that also encourages higher student achievement.

Pre-service teacher training is the single most widely employed strategy (by itself or with other strategies) to improve instructional quality This comes as no surprise. One of the most widely held beliefs underlying both national and international educational development activities is that the most direct and efficient way to improve instructional quality is to improve the content and pedagogical expertise of teachers through increased levels of training. This assumption is controversial, because evidence suggests it may not work that way

One problem is that, once trained, graduates frequently do not enter teaching With the skills provided by teacher training, graduates are qualified for jobs in the private sector or in other govenment agencies that pay better than teaching, and typically do not put the individual at risk of being assigned to a rural location A second problem is that, even if teacher training graduates enter teaching, it is not clear that more training (of the type often provided in pre-service training programmes) necessarily leads to better teaching or to improved student achievement (Chapman and Snyder 1993). Research on factors affecting student achievement have found only an inconsistent relationship between teachers' length of schooling and their students' achievement (Fuller 1987) One possible reason for this pattern of findings is that teachers, once trained, are unable to implement their newly learned behaviours within the school setting, so the potential benefits are then lost on the student

Combined with the uncertainty of results is that teacher training is an incredibly expensive undertaking. While the unit cost of teacher training is often greater than for regular secondary schooling, the real issue is that trained teachers command higher salaries. Efforts to upgrade large numbers of teachers have dramatic consequences for the recurrent education budget. In some countries, two additional years of teacher training can double a teacher's salary A teacher with a bachelor's degree might earn three times more. Given the cost implications, modifying the teacher training programme within a country is often a highly controversial activity It is not surprising, then, that national efforts to upgrade teacher training can become highly politicised

The case study by Beatrice Avalos and Paul Koro, traces the politics associated with national efforts to strengthen teacher education in Papua New Guinea (PNG) and, within that, how information was used within the political process. To do that, they examine the interplay of proposals, actions, tensions, and negotiations that led to the strengthening of the teacher training colleges in PNG, a process they suggest is illustrative of what occurs elsewhere when major reforms are undertaken

Over the last decade, a series of national commissions in PNG was convened to review the status of teacher education and make recommendations for how it might be strengthened. The main recommendations included extending the length of teacher training (from 2 to 3 years), upgrading the training programme to a diploma course, reducing the number of subjects taught within the teacher training programme and increasing the entry requirements.

Their case study traces how different constituent groups—teachers, the university community, international advisors, Ministry officials—received and interpreted information from the Commission reports differently. Those differences in interpretation linked to larger issues. At stake was control of the National Institute for Teacher Education. The issue was whether it would be autonomous, controlled by the Ministry of Education, or controlled by the Commission for Higher Education.

Avalos and Koro discuss the factors shaping the decision process including the quality of the information gathered initially, the form in which it was presented, and the extent to which it was accepted by the educational community. Contributing to the impact of the reports was research evidence substantiating the claims and the re-emergence of the same findings and conclusions across the multiple reports. Nonetheless, information from the reports was addressed selectively, with trade-offs along the way to accommodate the political process. As the researchers point out, information is sometimes disregarded when the direction it suggests clashes with other more powerful institutional agenda. However, they conclude that, ultimately, the influence of information on decision-making depended heavily on the quality and commitment of the people involved on all sides.

Improving School Practice Through Textbook Revision

Improving the textbooks children use is widely regarded as the quickest, most direct, and cost-effective means of improving the qulity of classroom instruction. Textbooks select, sequence, and pace the presentation of content which then largely defines what students learn. If textbooks are such an effective way of improving instruction, why then do so many teachers resist adopting new textbooks?

Yongsook Lee's case study, set in Korea, reports two experiences with textbook revision. The first occurred essentially as a top-down exercise, in which the Ministry of Education, having documented weaknesses of the existing materials, commissioned new materials which were then mandated for use in all schools. The second experience was with community initiated materials that were disseminated by word of mouth and quickly adopted by teachers in other schools.

In describing the top-down experience, Lee traces the impact on

Korean language instruction following revisions of the national textbooks The textbook revisions de-emphasised repetition and detailed reading comprehension of written passages while paying greater attention to speaking, listening and writing activities The changes were made after wide consultation, data collection, pilot testing of new materials, and research into innovative trends and practices in language instruction in other parts of the world.

Even though Korean educators realised their current teaching materials were weak and needed reform, teachers initially resisted the new textbooks. Teachers complained that they had to know more content and had to spend more time and energy in teaching from the new materials Teachers in the upper grades were concerned that the approach taken by the new materials would disadvantage their students on college entrance examinations, which were more clearly aligned to the previous materials

The second case study, of a bottom-up approach to textbook revision, traces the development and expansion of individualised learning materials in Korean primary schools The materials were developed by individual teachers and principals for use within their own schools and then shared with other schools. No school was forced to adopt the approach. Because materials were developed by principals and teachers (rather than scholars and government officials) they were better grounded in the realities of the classroom. Once introduced in the early 1990s, the materials were rapidly adopted in other schools The use of the more individualised materials resulted in higher student test scores, more positive student attitudes, and better teacher-student relationships.

The main lesson from the Korean experience in changing language texts is that it is probably easier to change textbooks than it is to change teachers' preferences and habits. Teacher resistance has to be overcome before new materials can achieve their promise. Teachers are afraid of being embarrassed by poor student performance on the new materials

The two case studies discussed in this chapter suggest that there is not a simple answer for whether top-down or bottom-up approaches are best. The approach must vary, depending on the specifics of the situation. Individualised instruction in Korea using a "bottom-up" approach has been quite successful, though by itself it could not change the basic content of teaching, which heavily depends on the contents of textbooks. The reform of Korean language textbooks, which followed a "top-down" approach, led to a nation-wide reform in the content and teaching of Korean language in a short period of time However, by themselves, changes to the textbooks could not change teacher-centred teaching practice. Only when both reforms worked together were both content and teaching methods reformed

Lee also argues that if a model for textbook revision is credible within *both* national tradition and foreign practice, it will have a better chance of being sustained A good example is the rapid expansion of individualised instruction in Korea Implementation was more successful (than earlier reform efforts) because it was rooted in both Korean tradition and in foreign practice.

Improving School Practice Through the Use of Multigrade Classrooms

A perplexing problem in developing countries is how to provide quality instruction in rural areas across the full range of subject areas at a reasonable cost. Rural schools tend to be small and economies of scale elusive. In this type of setting, multigrade classrooms, in which several grades are taught in the same room by a single teacher, offer a popular option. Multigrade teaching, when done correctly, offers many advantages (e g., repetition of previous materials for advanced students: early introduction to advanced materials for younger students. peer tutoring opportunities). When done poorly, it causes enormous problems for students (Hayes 1993; Thomas and Shaw 1992).

While multigrade teaching can have positive effects on student learning, a recent World Bank study identified three principal challenges that multigrade classrooms have to overcome if they are to be a viable option· (1) planning science and social studies curricula without content redundancy from year to year, (2) finding, hiring, and placing teachers qualified to teach in multigrade settings, and (3) convincing policy makers, curriculum developers, and parents that multigrade teaching can be more effective than singlegrade teaching.

Marcelina Miguel and Eligio Barsaga present a case study of the use of multigrade schooling to alleviate pressures created by rapidly rising enrollments in primary school in the Philippines The country faces simultaneous problems of low school quality and enormous pressures for access. The authors point out that, while Filipinos are among the most schooled children in the developing world, they rank quite low in cross-national comparisons of student achievement. Students go to school but do not learn as much as they should. At the same time, access has been constrained by lack of school facilities. There is a tug between putting resources into expanding access, through construction of new schools and new teacher training, and putting those same resources into upgrading quality, through upgrading of the existing teaching force.

Within this context, multigrade classes are seen as an important strategy for alleviating enrollment pressure while, potentially, improving instructional quality The authors describe the operation of a multigrade classroom and discuss how the use of multigrade teaching was upgraded to simultaneously improve both access and quality. Despite the anticipated benefits, the strategy entailed new problems for teachers. Most teachers found the complexity of multigrade classrooms to exceed the perceived payoffs and wanted to revert to teaching singlegrade classrooms

This teacher resistance sparked a major national initiative by the Department of Education, Culture and Sports (DECS) to improve the conditions and incentives for multigrade teaching. A study of approximately 12,000 multigrade classes highlighted the need for special training of multigrade teachers and materials specially designed to help teachers handle the complex dynamics of the multigrade settings

The core of this initiative has been teacher training and the provision of materials particularly designed for multigrade situations, with more emphasis on self-instructional materials, peer instruction, and programmed teaching materials The Philippine case study illustrates how a country can systematically use a centrally imposed, structural change in the internal organisation of schools to improve instructional quality

Improving School Practice Through the Use of National Testing

Governments are discovering what teachers have long known: Teachers teach to the test. Particularly in "high-stakes" testing, such as national school completers' examinations, teachers think they would be foolish to do otherwise. Governments evaluate schools, and often teachers, on the basis of students' test scores; parents do too Even when teachers want to introduce new content or instructional practices, a fear of disadvantaging their students on the exam constrains them

While teachers' tendencies to teach to the test are often cited as an impediment to introducing new instructional practices, some argue that these same tendencies can also be used to encourage instructional reform—*by intentionally changing national tests in ways that require teachers to teach differently in order for their students to do well on these exams* Educational reformers have long argued that one of the most direct means of changing what and how teachers teach is to change the national tests that pupils take at the end of a school year or educational cycle (e.g., primary school completers' examination) to emphasise the desired knowledge and skills.

Those advocating the use of testing to change classroom practice tend to group into two schools of thought about how tests can best improve instruction. The first emphasises using test information to motivate teachers to improve their teaching; the second emphasises the modification of tests as means of communicating new demands for what or how material should be taught.

Those most directly interested in motivation posit that providing teachers and communities with information about the performance of their own students and the performance of students in nearby schools creates useful competition As information about weak performance is made public, teachers whose students lag in performance have an incentive to try new instructional methods and/or upgrade their content skills. Somerset (1982) working in Kenya, reports that feedback of examination results did lead to improved results in subsequent administrations of the examinations. But findings are not consistent across countries. In Chile, Schiefelbein (1993) found that teachers tended to ignore national test results If students had a higher than average test score, teachers assumed there was no problem and no reason to revise their teaching methods. If students had a lower than average test scores, teachers attributed it to deficiencies in the students themselves, beyond the scope of anything the teachers might be able to help.

The second school of thought concerning testing also assumes that knowledge of results can spark student, parent, and peer pressure to improve instruction, but is more interested in using the test to promote specific types of changes in instruction. For example, a frequent goal in changing testing procedures is to emphasise problem-solving and higher order thinking skills. The goal is both to motivate teachers and to promote a specific approach to curriculum. Recent work by Capper (1993, 1996) illustrates how this can be done by changing the cognitive complexity of test items to encourage higher order thinking skills. Both uses of "high stakes" national tests as a means of influencing classroom instruction have received considerable interest, largely because national examinations are one of the relatively few mechanisms through which central governments can directly influence instruction at the classroom level.

Regardless of the road chosen, there are two problems for those introducing such reforms *First,* teachers may not have the content knowledge or pedagogical skills necessary to meet the new demands on them For example, a test that emphasises individual problem-solving skills may frustrate teachers who emphasise memorisation and group recitation Teachers may not know how to reshape their teaching to build student competence in problem-solving. *Second,* changing the test to force changes in instructions, if not done carefully, can result in students, parents, and teachers viewing the system as unfair. During the transition there is likely to be a period of misalignment between how students are taught and how they are tested, resulting in low student test score. Indeed, it is this very discrepancy, and student and parent reactions to it, that presumably create the pressure that motivates teachers to try new methods. Nonetheless, until a new alignment is achieved, the low test scores can result in substantial dissatisfaction from teachers, parents, and student alike.

One response is to try to enlist parents and teacher support for the changes. This is hard to do, because fiddling with tests is too technical to be easily explained. Perhaps more importantly, parents and teachers may perceive it (correctly) as threatening the balance of advantage across test takers Those who do well under the existing testing system may resist changes that put their advantage in doubt As interested as parents are in seeing the quality of education improve, they are often *more* interested in protecting whatever comparative advantage their own children might have gained from their schooling. They want to make sure their own children do not lose their positioning for whatever benefits accrue from their education. Despite polemics on the advantages of community participation in schooling, communities tend to be conservative They are often unwilling to risk their children's futures on experiments about what students should study or how teachers should teach.

London, in a case study set in Trinidad and Tobago, traces how the central government intentionally changed a national test as a means of changing the emphasis of classroom instruction in the area of written English, public reaction to that change, and how the Government then legitimised its actions. London traces the Government's decision to change the Eleven-Plus Examination, more popularly known in the Caribbean as the Common Entrance Examination, to give more emphasis to problem solving strategies and, by doing so, to encourage teachers to give more attention to critical thinking and writing (rather than rote learning) in their classroom instruction. This case study is a look at both how testing can be used to improve instruction and the politics of implementing a national educational reform.

The Eleven-Plus Examination was introduced into Trinidad and Tobago in 1961 as a device for allocating eligible primary school students to secondary school. Seen as an objective measure of merit, the test has been a key component in attempts to establish an egalitarian society in Trinidad and Tobago. It has wide support by parents, who believe that the test is an opportunity for their children to escape poverty and class prejudice. However, criticism of the test has grown in professional circles because of its heavy reliance on memorisation. In the late 1980s, Trinidad and Tobago changed the examination to include an essay-writing component, with the explicit assumption that this would lead to changes in the primary school curriculum and how teachers taught writing.

A seemingly positive change in the test led to considerable political opposition. Members of some socio-political groups believed that the addition of essay-writing on the new examination was discriminatory, specifically that the essay topics were biased in favour of the upper and middle classes ("A day at the seaside," "How I spent my summer vacation" and "The first snowfall of winter!"). No one disputed that proficiency in essay-writing would produce a more literate elementary school graduate. Rather, the concern was that social class distinctions inherent in the process of essay writing and evaluation would be biased against the poor

London explores Government's use of strategies to bolster the legitimacy of the proposed change. The Ministry of Education tried to support its changes to the test by appealing to *research*, external *expertise*, and *symbols* (essays were symbolised as high status while multiple-choice items were low-status). Interestingly, the Government did not invite community participation in the decision-making The participatory approach appeared to have been intentionally by-passed. Teachers, key personnel in making the new curriculum venture work, were not consulted, nor were coalitions and interest groups such as Teachers' Unions and Parent-Teacher Associations.

The rationale for not encouraging wider participation in the decision involved at least two considerations. First, wider participation would have increased the costs, particularly the non-monetary costs (e.g., friction among constituent groups), in implementing the reform. Second, major political interests supported the shift to essay-writing so the shift was regarded as politically safe An apolitical move by many standards, the Government's refusal to involve opposing groups did not, therefore, appear to be a crucial omission.

The experience in Trinidad and Tobago offers an insight into how central government can influence instructional activities at the classroom level. Through the changes to a national test, a curriculum policy (that essay writing should be taught in the elementary schools) was implemented and, over time, teachers' classroom practice did change London concludes that the decision by Government to emphasise essay-writing on the Common Entrance Examination was a good one, despite initial opposing forces. At the same time, the experience provides an insight into how even seemingly small changes to educational practice can arouse controversy and dissent within the community

LOOKING ACROSS THE CASE STUDIES

The case studies paint a positive picture. Across many countries, education leaders are actively experimenting with new strategies and programmes aimed at forging stronger and more direct ties between central level policy formulation and school level practice Nearly all of the case studies reported some type of government effort to more actively mobilise and engage individuals at the school and community members in the issues of their local schools. Nearly all highlight the importance of information sharing as a key element of this mobilisation. At the same time, the case studies identify the challenges ahead Four recurrent themes that emerge across the case studies provide a window into the practical, cross-cutting issues most often encountered in national education reforms.

The first theme is the political nature of educational reform and the tension between political versus technical solutions to the education problems governments are trying to fix

Avalos, discussing the political friction that surrounded the reform of teacher education, points to the importance of constituent participation London, describing the use of national testing to change teachers' instructional practices and the interplay of constituent groups in that process, illustrates the opposite point—the desire of some governments to *avoid* public participation in a decision affecting school practice

A second theme is the importance of involving community members in decision-making about their local school, the information needed to support that type of participation, and the possible unintended negative consequences of opening up the decision process.

The importance assigned to community participation may understate the practical problems encountered working effectively with additional constituent groups Increased local participation increases conflict, friction, and rubs among groups. While presumably contributing to better local decisions, it can have a costly downside that governments need to understand as they undertake the process Lee develops this point in her description of textbook reform Adams and Boediono make a similar point in discussing information system development Reimers offers an example of community involvement that backfired

A third theme, closely related to the second, concerns strategies for getting more useful information into the hands of decision-makers and encouraging their use of it in planning and programme management

The supply-side orientation of many information systems and the need for stronger incentives for information use are essential prerequisites to the better use of information systems in the support of educational reform. This argument is illustrated in the studies of data use in Indonesia (Adams and Boediono) and decentralisation of the data system in Jordan (Ahlawat and Billeh)

A fourth theme concerns the need for better ways to capture and work with information about the teaching and learning activities that operate at the school and classroom level.

Ministry level officials, operating away from the day-to-day realities of a school, often rely on the output of management information systems to shape and justify their planning Authors of these case studies argue that there is a lot more reality about the dynamics of a school than gets captured in an information system The challenge to central education planners is to find ways that information systems can capture the dynamic flows of decision-making—the politics, interpersonal subtleties, unequal power relationships, and the personalities that actually shape what happens in schools Adams and Boediono touch on this by describing efforts to involve community members in educational planning in Indonesia, Ahlawat and Billeh address this in describing the decentralisation of the data system in Jordan It is an essential part of Barsaga and Miguel's case study of multigrade classrooms

Cutting across all of the case studies are two other messages First, the things central education ministries can do to influence practice at the school and classroom levels are far fewer than most educators and government officials would like to believe. They can try to change school and classroom activities by changing the level or mix of inputs, for example, by changing the curriculum or textbooks They can try to change the instructional process *directly,* through such things as teacher training, or *indirectly,* through such things as changes to the national examination or through increased community involvement. Nonetheless, there are often important differences between the intentions that central planners thought they initiated and the changes (if any) that are actually implemented in the schools Experience suggests that the real challenge is not in identifying the options for central level intervention (though that is important) It is formulating a workable plan for implementing these strategies in some combination that recognises both the loose relationship among levels of many education systems and the probability that interventions designed to address one problem will likely have unanticipated impacts that create new problem Only with relevant, timely, useable information can such plans be developed and implemented

Second, it is clear from the preceding country studies that a rich variety of approaches aimed at finding the right combination of ideas, communication, and working relationships between central ministries and schools are already underway across countries These initiatives are operating in both directions While central authorities are seeking better ways to influence school practice, local schools and communities are discovering new ways to influence government decision-making that affect their schools.

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Developments in Educational Effectiveness Theory and Research in the Netherlands

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In this contribution, the development of a comprehensive model of educational effectiveness is described. In this model, the key factors of quality, time and opportunity are elaborated at all educational levels (student, classroom, school and educational context) A series of studies was started to test the hypotheses put forward by the model Research questions (about the effects of characteristics and configurations of characteristics in the model on achievement, about differential effects, about effects on metacognitive skills and about the stability of effects) were derived from the model Implications of the findings for the effectiveness model are discussed.

1. A COMPREHENSIVE MODEL OF EDUCATIONAL EFFECTIVENESS AS THE POINT OF DEPARTURE FOR A RESEARCH PROGRAMME

Educational effectiveness is a very important concept within the educational sciences Attention to educational effectiveness has its origins in school effectiveness. The early research projects carried out by Brokover et al. (1979) and Edmonds (1979) in the United States and Rutter et al (1979) in the United Kingdom have shown that schools differ from each other with respect to the outcomes of comparable groups of students. Later, the focus became broader than effectiveness at the school level only, as it became clear that effectiveness is achieved at different levels of the system: primarily at the classroom level where instruction and learning take place. Other levels in the system, such as the school level and the context level, merely provide the conditions for effective instruction at the classroom level

Educational effectiveness research is ideally aimed at explaining the variance in educational outcomes, based on a theory of causes and effects in education In this sense, a theory on educational effectiveness can be seen as an integral theory of education which takes into account the outcomes of education, the inputs, the processes and the contexts in which education takes place. The development of a conceptual framework is an important contribution to educational effectiveness research, because it can guide the design of research studies and the interpretation of the results at a later stage In turn, research results can give rise to a further refinement of theoretical concepts and relations between these concepts.

This contribution is an illustration of the way in which a conceptual framework has given direction to a set of research studies. The conceptual framework at stake in the comprehensive model of educational effectiveness developed by Creemers (1994). The research studies were recently carried out by researchers of the Groningen Institute for Educational Research (GION) in the Netherlands.

In the second section, a short outline of the Creemers model will be provided and its essential concepts will be introduced and explained. The other sections of this contribution give examples of research studies which have made use of the Creemers model in their selection of variables and their interpretation of results Most of these GION studies focus on characteristics on one or more levels of the model and their impact on student achievement. However, other educational outcomes, such as metacognitive skills, have also been integrated in educational effectiveness studies recently In addition, GION studies have been undertaken to answer fundamental effectiveness questions that go beyond the characteristics in the model. These studies deal with questions about the stability of school effects. The studies presented here subsequently deal with the following research questions, derived directly from the Creemers model.

- What are the effects of configurations of school level and classroom level characteristics on student achievement? (section 3)
- Are there any differential effects of school and classroom level characteristics on student achievement in schools with different types of student populations? (section 4)
- What are the effects of school level and classroom level characteristics on metacognitive skills of students? (section 5)
- How stable are effects of schools? (section 6).

The last section summarises the main conclusions of the research studies and discusses their implications for the comprehensive model of educational effectiveness.

All studies which are presented here have made use of large-scale datasets of primary schools (students, teachers, principals) in the Netherlands. The only exception is the study on metacognitive outcomes The data for this study were collected in the first year of secondary education However, as the data collection took place only a few months after the students had left primary school, we decided to include these analyses in this overview because they can throw some light on school effects on other types of outcomes than mere achievement measures These other types of outcomes have often been neglected in effectiveness research Therefore, more information in this field of research is useful in the context of this overview

To answer the effectiveness questions of the studies, the original data were re-analysed using the concepts of the Creemers model. All studies made use of sophisticated multi-level techniques for an adequate analysis of the hierarchical structure (two levels or more) of the data The original data did not encompass all of the concepts in the model Moreover, the original data were exclusively collected by means of written questionnaires. As a consequence, the operationalisation of concepts and variables often is somewhat global and not always very detailed and refined (see also section 7). Re-analysing these data certainly has its limits, but still is a useful first step in the testing of hypotheses put forward by the model At this moment, the GION research programme also includes observational studies and quasi-experiments in the field of educational effectiveness. The results of these studies will be reported at a later stage

The main focus of the GION research programme on educational effectiveness is the empirical testing of effectiveness hypotheses In addition, activities are undertaken that might lead to alternative hypotheses for effectiveness phenomena An example is included in Appendix A The Creemers model was based on results from several research traditions, with an emphasis on research on instruction, research on grouping procedures, and research on curricula defined as the specific and concrete curricular materials that are used by teachers and students in their classrooms Appendix A shows a view on curriculum effectiveness in which the curriculum is defined in a different way The implications of curriculum productivity research for an alternative model of educational effectiveness and effectiveness research are discussed (see Appendix A).

2. TOWARDS A THEORY OF EDUCATIONAL EFFECTIVENESS: A COMPREHENSIVE MODEL

In the nineties, several models for school effectiveness have been developed The basic idea behind all models fo school effectiveness is to distinguish between levels in education All models include at least the individual student level, the classroom level and the school level The higher levels in the models are supposed to provide the conditions for what happens at the levels below. This means that not just one level induces results, but a combination of levels. Elaborations of this basic multi-level model were provided by Creemers (1991), Scheerens (1992), Stringfield and Slavin (1992), Stringfield (1994), and Slavin (1996) All their models are more or less based on the Carroll model for school learning (Carroll 1963, 1989). In the Carroll model, the time needed for mastering the educational objectives is considered as a function of student characteristics and the quality of instruction.

Most of the models developed so far are rather detailed at the classroom level. The school level often shows a more diffuse selection of variables. Based on ideas about how the school level can provide conditions for the instructional level, and also on insights from organisational theories, possible characteristics are discerned. In the QAIT-MACRO model (Stringfield & Slavin 1992) these characteristics are meaningful goals, attention to academic functions, coordination, recruitment and training, and organisation In the model provided by Scheerens (1990), achievement orientation, organisation of the school in terms of educational leadership and consensus, quality of the school curricula in terms of content coverage, form and structure, and an orderly atmosphere are distinguished But how these characteristics influence what goes on at the classroom level, between classes at the same grade level and between grade levels, remains unclear.

2.1 Quality, Time and Opportunity

The model developed by Creemers (1994) is based on the key concepts of quality, time and opportunity. These concepts are defined at each educational level Each level has its own characteristics which fill in the key concepts The characteristics are selected because of their relatedness to one of the key concepts and, preferably, also on the basis of their empirically demonstrated impact on student outcomes.

The main aim of the Creemers model is to explain differences in student achievement (basic skills, higher order skills, and metacognitive skills) by means of educational characteristics. The model is based on the Carroll model of school learning (1963) A central concept of the Carroll model, time, plays a central role in this model too but it is now systematically complemented by the concept of opportunity to learn. The main differences between these two models can be found in the way in which the role of the teacher and of levels higher than the classroom are defined The Carroll model concentrates on two levels only: the student level and the classroom level In fact, the model focuses nearly exclusively on the student level, whereas the classroom level is not specified in any detail. The only classroom characteristic mentioned is quality of instruction, a characteristic that is not clearly defined in the original model. In contrast, Creemers put quality of instruction at the core of his model of educational effectiveness and integrates findings from several research traditions to give more meaning to the characteristics that constitute quality of instruction The model has four levels. the student level, the classroom level, the school level and the context level

2.2 Assumptions of the Model

The model builds on the following basic assumptions.

Quality, time and/opportunity to learn are the key concepts in the educational effectiveness model. Time on task and opportunities to learn provided by the teacher (at the classroom level), and these are influenced in turn by the quality of instruction. However, quality, time and opportunity at the classroom level are influenced by characteristics at the school level that may or may not promote these classroom level characteristics. For example, a teacher will have trouble in achieving high levels of time for learning in his classroom when the school does not have a policy that is supportive for reaching this goal The same holds for context characteristics as conditions for school characteristics. So, quality, time and opportunity are not only the key concepts at the classroom level but at the school and the context level as well

The influence of context, school and classroom level characteristics is mediated by time on task and opportunities used, two concepts at the student level. Teachers are able to influence time for learning and opportunity to learn in their classrooms by the quality of their instruction. The more adequate their instruction, the more time students can actually spend on learning and the more opportunities to learn they will have For example, more school subjects or topics within subjects will be offered But even when teachers achieve very high levels of time for learning and opportunity to learn, ultimately the students decide for themselves how much time they will actually spend on their school work and how much opportunities to learn they will actually use Therefore, these two concepts at the student level are directly related to student achievement. In addition, student achievement is also determined by student characteristics such as aptitudes, social background, and motivation

The higher levels are conditional for the lower levels. Characteristics at the context level are conditional for characteristics at the school level, characteristics at the school level are conditional for characteristics at the classroom level, characteristics at the classroom level are conditional for student achievement Student achievement cannot be seen as either an accomplishment of teacher level characteristics only (as in many studies on teacher behaviour) or of school level characteristics only (as in many studies of school policies), but it should be seen instead as a result of relationship between characteristics at both levels

Although the context and school level characteristics are supposed to have some influence on student achievement, they are not supposed to influence achievement directly. Their influence is indirect, by means of processes at the classroom level. Context and school level characteristics determine to some extent what happens in classrooms, and thereby can exert their influence on students

All characteristics to be included in the educational effectiveness model at the classroom level and the school and context levels are conceptually related at one of the key concepts. If this is not possible, the characteristic does not appropriately fit into the model and is left out For example, a school level characteristic that is often considered effective is the leadership capacity of the principal or deputy (Mortimore et al 1988) In this model, leadership capacities as such are not considered an essential feature but the way a principal or a deputy enhances quality, time or opportunity is.

The comprehensive model of educational effectiveness developed by Creemers (1994) is shown in Figure 1.

In the following, the characteristics included at the four levels in the model will be explained further. In addition, the concept of the formal criteria will be outlined

2.3 Characteristics at the Student Level

The students' background, their motivation and their aptitudes strongly determine their achievement. Time on task is the time students are willing to spend on school learning and on educational tasks. It is determined not only by the motivation of students, but also by the time provided by the school and by processes at the school and classroom levels. Time on task is the time students are really involved in learning, but this time has to be filled by opportunities to learn These opportunities concern the supply of learning materials, experiences, and exercises by which students can acquire knowledge and skills. In fact, learning opportunities are the instructional operationalisation of the objectives of education, whereas tests are the evaluative operationalisation of the same objectives. In this respect one can seek about the content coverage of the curriculum. A distinction is made between opportunities offered in the instructional process and students' actual use of the offered experiences.

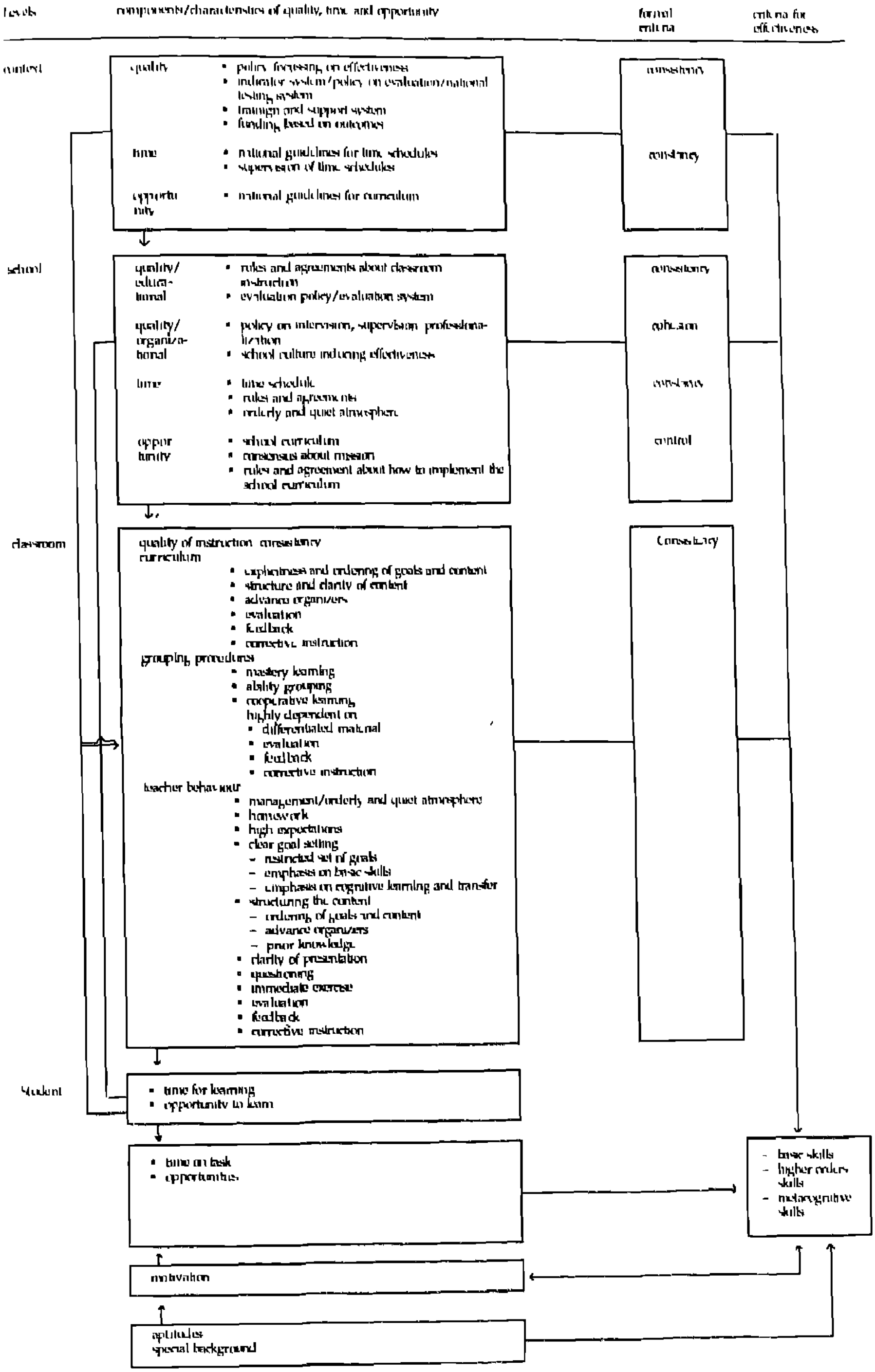

Figure 1. A comprehensive model of educational effectiveness (Creemers, 1994).

2.4 Characteristics at the Classroom Level

Next to the earlier mentioned variables time and opportunity, the quality of instruction determines the outcomes of education. The three components of quality of instruction are the curriculum, grouping procedures and teacher behaviour (Creemers 1991) Based on theoretical notions and empirical research, effective characteristics of these three components of quality of instruction were selected for inclusion in the model.

With respect to curriculum these characteristics are the following:

- explicitness and ordering of goals and content,
- structure and clarity of content;
- advance organisers,
- material for evaluation of student outcomes, feedback and corrective instruction.

With respect to grouping procedures they are:

- mastery learning;
- ability grouping;
- cooperative learning,

highly dependent on.

  * differentiated material;
  * material for evaluation, feedback and corrective instruction.

With respect to teacher behaviour they are:

- management, orderly and quiet atmosphere;
- homework,
- high expectations,
- clear goal setting·
  * restricted set of goals;
  * emphasis on basic skills;
  * emphasis on cognitive learning and transfer;
- structuring the content·
  * ordering of goals and content;
  * advance organisers;
  * making use of prior knowledge of students,
- clarity of presentation;
- questioning;
- immediate exercise after presentation of new content;
- evaluation, feedback and corrective instruction.

It is obvious that teachers are the central component in instruction at the classroom level They make use of curricular materials and they actually carry out grouping procedures in their classrooms However, teachers need curricular materials, which should be consistent with the grouping used.

2.5 Characteristics at the School Level

Looking at the well-known lists of effective school characteristics (Levine & Lezotte, 1990, Scheerens, 1992; Reynolds, 1993), it becomes clear that most of the characteristics (such as an orderly climate in the school, evaluating student achievement at school level) are in fact reflections of the indicators of quality of instruction, time and opportunity to learn at classroom level in one design, it is hard to say what the separate contribution of these characteristics might be in accounting for student level variance when controlling for classroom level characteristics. In any case, many school level characteristics are rather meaningless when they are not clearly linked to classroom characteristics (Creemers 1992) Even if they do have an independent effect on student achievement, it is still not clear how this effect comes about and how it should be interpreted

In the model, all school level characteristics are defined as conditions for classroom level characteristics This definition restricts the selection of school level characteristics only to those characteristics conditional for and directly related to quality of instruction, time or opportunity to learn.

Except for basic characteristics such as the presence of a time schedule and a school curriculum the school level characteristics refer to the shared responsibilities and ideas of teachers when they want to work as a team Most school level characteristics have to do with a system of rules and agreements between teachers about their classroom practice and facilities to implement and to control these rules and agreements. The quality characteristics at the school level are divided in two groups· educational characteristics that deal directly with what is going on in the classroom, and organisational characteristics that also determine what happens in classroom but now from a greater distance. To enhance quality of instruction at the classroom level, a school should cover both groups of characteristics. In addition, a school should watch over time and opportunity as well.

At the school level, the conditions for quality of instruction with respect to the educational aspects are·

- rules and agreements about all aspects of classroom instruction, especially curricular materials, grouping procedures and teacher behaviour, and the consistency between them,

- an evaluation policy and a system at the school level to check student achievement, to prevent learning problems, or to correct problems at an early stage. This includes regular testing remedial teaching, student counselling, and homework assistance.

With respect to the organisational aspects of the school level, important conditions for quality of instruction are

- a school policy on intervision and Supervision teachers, departmental heads and school principals (educational leadership), and a school policy to correct and further professionalise teachers who do not live up to the school standards;
- a school inducing and supporting effectiveness

Conditions for time at the school level are.

- the development and provision of a time schedule for subjects and topics,
- rules and agreements about time use, including the school policy on homework, student absenteeism, and cancellation of lessons,
- the maintenance of an orderly and quiet atmosphere in the school

Conditions for opportunity to learn at the school level are·

- development and availability of a curriculum, school working plan or activity plan;
- concensus about the "mission" of the school,
- curriculum, especially with respect to transition from one class to another or from one grade to another

2.6 Characteristics at the Context Level

The same components as mentioned before, quality, time and opportunity to learn can be distinguished at context level Quality regards the following conditions

- a (national) policy that focusses on effectiveness of education;
- the availability of an indicator system and/or national policy on evaluation/a national system;
- training and support promoting effective schools and instruction;
- funding of schools based on outcomes.

Time at the context levels refers to national guidance with respect to the time schedules of schools and the supervision of the maintenance of schedules The opportunity to learn at the context levels refers to national guidelines and rules with respect to the development of the curriculum, the school working plan and the activity plan at the school level, for example, by a national curriculum.

It is clear that at the different levels, certainly at the context level, resources are also important, but resources should be defined as in this model availability of materials, teachers and other components supporting education in schools and classrooms

2.7 Formal Criteria: Consistency, Cohesion, Constancy and Control

In addition to the characteristics at the classroom and context levels, more formal characteristics can be discerned (Creemers 1992) The main features of the model are the sets of characteristics, selected on the basis of a theory on learning in classrooms and schools in combination with the empirical validity of the characteristics The major gain of this model is the conceptual interrelatedness of the individual characteristics by the concepts of quality, time and opportunity. Although focussing on the sets of characteristics, the model exceeds these characteristics by making some tentative statements about their joint impact on student achievement by introducing the formal criteria of consistency, cohesion, constancy and control.

The *consistency* principle can be described at the classroom and context levels According to this principle, the effectiveness of classrooms, school and contexts is enhanced when the characteristics at these levels are in line with each other and therefore supporting each other An example at the classroom level might illustrate the consistency principle. A maths curriculum which offers tests and corrective instruction might promote evaluative behaviour of the teacher much more stronger than a maths curriculum not offering these facilities Although all selected characteristics at the classroom level are supposed to be necessary for effective education, an emphasis on one characteristics might reduce the impact of another characteristics (Gamoran 1986). For example, the implementation of a very refined and detailed grouping procedure might be so demanding for teachers that the actual time for learning in their classrooms is reduced

At the school level consistency between the components, which are in line with each other, is an important condition for instruction All members of the school team should take care of that, thereby creating *cohesion* Creemers (1991) points at the importance of continuity, meaning that schools should not change rule and policies every other year This implies the *constancy* principle, which, however, can only be demonstrated in research in a longitudinal setting, by comparing school level characteristics from year to year. The *control* principle not only refers to the fact that student achievement should be evaluated, but also to the quiet atmosphere in the school. Control also refers to teachers holding themselves and others responsible for effectiveness

At the context level consistency, constancy and control are again important formal characteristics which can be formulated, emphasising the importance of same material characteristics over time and of mechanisms to ensure effectiveness

2.8 Research in Educational Effectiveness

The main principle for effectivenss instruction, according to the model, is to combine the three components of instruction (curriculum, grouping procedures, teacher behaviour) and especially to pick up the same effective characteristics in each instructional component, to increase their total influence. This influence could be further enhanced by looking for conditions for effectiveness at the school level and at the context level. The model suggests a theory based on the key concepts of time, opportunity and quality, to bring together the different levels of effectiveness

The next phase, and in fact this is a phase that accompanies theory development, is looking for principle evidence. For that purpose, we need well-designed large survey studies as well as case studies, with an emphasis on the measurement of multiple outcomes and on processes at the classroom level and at the school level. A first step is reanalysing available large datasets to test the hypotheses of the educational effectiveness model. The following sections are examples of these kind of reanalyses

3. THE EFFORTS OF CONFIGURATIONS OF SCHOOL LEVEL AND CLASSROOM LEVEL CHARACTERISTICS ON STUDENT ACHIEVEMENT

Effectiveness research has led to a large set of effective classroom and school characteristics, which are all supposed to have some positive influence on student achievement Lists of these characteristics suggests that they are all equally important Also, these lists do not make a substantial difference between classroom and school characteristics and they do not pay attention to the mutual influence of characteristics at both levels. The comprehensive educational effectiveness model of Creemers (1994) tries to overcome these problems by relating the isolated characteristics to a specific level of effectiveness (i e., the classroom level, the school level, the context level) and to the overarching effectiveness key constructs of quality, time and opportunity The same three constructs are thought to be operative at each of the levels in the effectiveness model

Moreover, isolated characteristics can boost each other's effects when they are applied together, as meaningful configurations In such a configuration, characteristics do not oppose each other or hinder each other's effects on student achievement but they are in line with each other This is called the consistency principle

3.1 Research Questions

To test the empirical validity of the effectiveness model, two research questions were answered

1 Do the classroom and school characteristics defined in the model have the expected effects on student achievement?

The characteristics in the model are expected to have positive effects on achievement. In fact, most of the characteristics were actually included because they had empirically shown to have positive effects However, most effectiveness research so far has not focused on a lot of characteristics at the same time Most research studies some characteristics and leaves out most of the others that might be important as well Therefore, it is possible that some characteristics take away each other explanatory power when they are analysed together. As a consequence, the absence of effects is also considered in line with the exceptions of the model. Only negative effects of characteristics are directly opposed to the hypotheses put forward by the model.

To answer this research question, multi-level analysis (VARCL, Longford, 1988) was applied using three levels (students nested within teachers nested within schools) In total, six analyses were performed The study included two dependent variables (language achievement and maths achievement) and three cohorts of primary school students

2 It is possible to find configurations of characteristics at the classroom and the school levels which can be considered as examples of the consistency principle, and if this is also, what are the effects of these configurations?

According to the consistency principle, configurations with a higher level of consistency might be expected to have more positive effects on students achievement A consistent configuration of characteristics at the classroom level means that the curriculum, the grouping procedures, and the behaviour of the teacher are in the line with each other, thereby promoting time for learning and opportunity to learn and, in the end, student achievement A consistent configuration of characteristics at the school level means that the variables measuring quality, time and opportunity all go in the same direction and do not reduce each other's effectiveness

To answer this research question, cluster analysis was performed as a first step to define configurations of characteristics as more or less consistent Additionally three-level analysis was performed to test the effects of the configurations on student achievement

3.2 Sample

Re-analyses were performed on data that were initially collected for the evaluation of the Dutch Eucational Priority Policy (Van der Werf et al. 1991) The data refer to a large set of about 700 Dutch primary schools, in which school with high proportions or lower class children and/or ethnic minority students were oversampled due to the aims of the evaluation study However, a subsample in the Educational Priority Policy sample represents a random sample of primary schools and this subsample can be seen as an adequate reflection of the Dutch primary school population. The reanalyses pertain to this random sample.

Repeated measurement took place in 1988, 1990 and in 1992 During each round of data collection, students as well as teachers and principals participated. Students from grades 4, 6 and 8, (age groups 8, 10 and 12) took several tests in the beginning of the school year The school teachers that had taught these groups of children filled in written questionnaires and so did the principals of the schools. Because of the repeated measurement, several subsequent cohorts of children in the same schools can be studied now (see Figure 2).

year of testing	1988	1990	1992
cohorts tested			
			grade 4
		grade 4	grade 6
	grade 4	grade 6	grade 8
	grade 6	grade 8	
	grade 8		

Figure 2. Student cohorts in the sample of the evaluation of the Dutch Educational Priority Policy.

Figure 2 shows that one cohorts of students has now been tested three times during their primary school career: they were in grade 4 in 1988, in grade 6 in 1990 and in grade 8 (the final grade of Dutch primary education) in 1992. All other student cohorts have been tested once or twice.

The dependent variables were maths and language achievement. The achievement measurement corrected for 2 years earlier refer to two cohorts of students (the students that were in grade 4 in 1988 or in 1990 and in grade 6 two years later, and the students that were in grade 6 in 1988 or in 1990 and in grade 8 two years later). The achievement measurement corrected for 4 years earlier concerns one cohorts of students, who were in grade 4 in 1988, in grade 6 in 1990 and in grade 8 in 1992. The teacher level was not appropriate for these analyses because of nesting problem

The independent variables were 11 classroom characteristics· quality of the curriculum, implemention of the curriculum, use of curriculum tests, grouping procedures, homework, clear goal setting, evaluation, feedback, corrective instruction, time for learning and opportunity to learn There were 6 school characteristics· school rules about classroom instruction, evaluation policy, intervision policy (professionalisation of the school team), rules about the use of time, orderly atmosphere, rules about the implementation of the school curriculum All characteristics were directly derived from the Creemers model

A total of 129 schools and 516 teachers (258 from 1990, 258 from 1992, two teachers per school) were used in the re-analyses The number of students varies from 1531 (one cohorts) to 3762 (two cohorts).

3.3 Research Results

Effects of Characteristics

After controlling for the students level factors there are still proportions of variance at the school and the school level, that might be accounted for by the classroom and school factors derived from the educational effectiveness model Table 1 gives an overview of the regression coefficient estimates of these factors Only the statistically significant regression coefficients are introduced in Table 1

Most student factor effects are fairly stable over subjects as well as over the dependent variables (achievement gain over 2 years and over 4 years), except for the gender effects. Prior achievement and intelligence show consistently positive effects on achievement, while a lower social class background or an ethnic minority background show consistently negative effects. These negative effects are much stronger for the achievement gain over 4 school years than they are for the achievement gain over 2 years

Concerning the classroom factors, Table 1 shows negative or mixed (sometimes positive, sometimes negative) effects on student achievement of 3 factors. feedback, time for learning and opportunity to learn Then there are 4 factors that do not have any affect at all use of curriculum tests, grouping procedures, evaluation and corrective instruction. In the end, there are 4 classroom factors that have positive effects quality of the curriculum, implementation of the curriculum, homework and clear goal setting. These positive effects are not very stable over effectiveness criteria and school subjects, however. In fact, only homework and goal setting show stability in the way the effectiveness model assumes

Concerning the school factors, the picture in Table 1 is not essentially different· 2 school factors (rules about classroom instruction and evaluation policy) have mixed effects, 2 more school factors have negative effects (policy on intervision and rules about time use) and 1 school factor (rules about the implementation of the school curriculum) has no effect at all. Only 1 out of 6 school factors shows a positive impact on achievement (orderly atmosphere) This positive effect however is not stable over effectiveness criteria and school subjects

To summarise, some characteristics (8 out of 11 classroom characteristics, 2 out of 6 school characteristics) show the expected effects on student achievement, i e., either positive effects or no effects The other characteristics show negative effects, which is contradictory to the expectations of the effectiveness model However, even when characteristics have positive effects, these effects are not stable across analyses, i.e., across cohorts of students and school subjects

Effects of Configurations

Both the classroom and the school level characteristics can easily be clustered into meaningful configuration At the classroom level, 5 clusters were constructed for language instruction. These can be described as generally effective (high scores on all effectiveness characteristics), focusing on grouping, focusing on evaluation, focusing on homework, and generally ineffective (low scores on all effectiveness characteristics.) For mathematics instruction, 3 clusters were found. These can be considered as generally ineffective (low scores on all characteristics), focusing on instruction, and focusing on a clear school policy

According to the consistency principle, the most positive effects can be expected of the generally effective clusters while the generally ineffective clusters should lead to the most negative effects. The other clusters might show effects in between both other types of clusters. However, the findings do not support these hypotheses Most clusters do not clearly differ in their effects on achievement and their effects are not stable across cohorts of students and across school subjects.

3.4 Conclusions

Because of the instability of effects of characteristics and clusters of characteristics, it is rather hard to draw firm conclusions about the empirical

TABLE 1

Effects of Students, Classroom and School Level Factors on Language (L) and Maths (M) Achievement

dependent variable	L2	L2	L4	M2	M2	M4
grand mean	49 4	42.3	57 2	20 8	35.8	34 2
student level factors						
-prior achievement	4	.4	3	5	5	4
-intelligence	2	2	2	2	2	3
-gender girls		1 4		-2 8	-1 1	-3 2
-Dutch lower social class	-2 9		-4 3	-2 4		-3 4
-ethnic minority	-7 7	-7 3	-12 3	-4 5	-2 5	-6.1
classroom level factors						
-quality curriculum						2 1 (2)
-implementation curriculum			1.2 (2)			
-use of curriculum tests						
-grouping procedures						
-homework			1.2 (2)	8		
-clear goal setting		.7	1.7 (1)	8		2 5 (1)
-evaluation						
-feedback			-2 2 (2)		1 2	-1 8 (2)
-corrective instruction						
-time for learning	-.1		- 1 (1)			
-opportunity to learn		- 1	- 1 (2)	.1		
school level factors						
-rules classroom instruction	2	.4				- .5
-evaluation policy	3		4		- 2	
-intervision policy						- .3
-rules time use	- 5					
-orderly atmosphere						.7
-rules implementation curriculum						
% of variance not accounted for						
-student level	62	56	70	51	49	54
-classroom level	3	5	n a	4	4	n a
-school level	2	1	2	3	3	6
-total	67	62	72	58	56	60
improvement of the fit of the model, compared to the model including only the 4 students factors	no	no	yes	no	no	yes

L2 means achievement corrected for prior achievement two years earlier, L4 corrected for four years earlier (between brackets for L4 and M4 is explained whether the first or the second teacher in the analysis is causing the effect) validity of the educational effectiveness model of Creemers on the basis of this study. Further research should pay more attention to the operationalisation of the characteristics in the model and should include more characteristics, especially the characteristics that most clearly reflect the key constructs of quality, time, and opportunity to learn

4. DIFFERENTIAL EFFECTS OF SCHOOL AND CLASSROOM LEVEL CHARACTERISTICS ON STUDENT ACHIEVEMENT IN SCHOOLS WITH DIFFERENT TYPES OF STUDENT POPULATIONS

The Creemers model for educational effectiveness is supposed to be a general model that holds for all students, irrespective of their socio-economic background and ethnicity The model hypothesises that the classroom variables and the variables at the school level are equally important for children in general as for children who come from disadvantaged families The model does not predict differential effects of school and classroom level characteristics on different groups of students

In this study, the dataset of the national evaluation of the Dutch Educational Priority Programme was re-analysed to test the empirical validity of this hypothesis.

4.1 Research Questions

The research questions for this study are the following·

1. *Which school and instruction characteristics in the model of Creemers are effective for student achievement?*

This research question aims at the overall effectiveness of the characteristics in the model with respect to student achievement.

2. *Are these school and instruction characteristics equally effective in schools with different student populations?*

This research question specifically aims at differential effects of the characteristics in the model with respect to student achievement.

4 2 Sample

Re-analyses were applied on data that were originally collected for the evaluation of the Dutch Educational Priority Programme (see also 3 2 for information about this dataset). About 700 primary schools participate in this evaluation Students in grades 4, 6 and 8 were tested in 1988, 1990 and 1992 Tests for intelligence and for maths and language achievement were applied In addition, data about the socio-economic background (SES) of students and ethnicity were collected.

For the analyses in this study, the total sample was divided into three groups of schools

- schools with more than 30 per cent ethnic minority children (n=112, 1406 students);
- schools with more than 50 per cent Dutch low SES children and less than 30 per cent ethnic minority children (n=126; 1656 students),
- schools with more than 50 per cent middle and high SES children and less than 30 per cent ethnic minority children (n=57; 996 students).

Within these schools, only the data of all students who were involved in three measurements (grade 4, 1988, grade 6, 1990 and grade 8, 1992) were analysed

4.3 Variables and Instruments

The dependent variables were student achievement in Dutch language and mathematics, measured in grade 8, corrected for prior achievement in grade 4, intelligence, SES and ethnic origin

Some of the independent variables measure characteristics which are present in the Creemers model Because of the specific aims of the evaluation of the Dutch Priority Policy, many other characteristics were measured too. Not all of these additional characteristics are directly represented in the model, however, although they are more or less often included in effectiveness research

The independent variables in the analyses were 9 school characteristics rules followed by the school, educational leadership, team cohesion, use of an evaluation system, aspirations, appointments with parents, emphasis on achievement, motivation of teachers and optimism about enhancing educational opportunities. There were 12 classroom characteristics· time spent on maths/language, allocation of time within lessons, differentiation, minimum goals, feedback, task control, frequency of homework, time spent on homework, additional instruction for disadvantaged learners, emphasis on cognitive skills, textbooks that are used and implementation of textbooks The independent variables were measured with written questionnaires filled in by school principals and teachers

4.4 Analyses

Multi-level analyses were applied to answer the research questions. There were two levels involved (students nested within schools). The teacher level data were aggregated to the school level For each category of schools, the empty model was specified as a first step (the model without student, school and teacher variables) Subsequently the student variables prior achievement, intelligence, SES and ethnicity were specified in the model. The variance at the school level that remains after specifying the student variables indicates the difference in quality between schools, and this quality can potentially be explained by school and instruction variables.

The school level variance for the three categories of schools is 15 per cent, 17 per cent and 13 per cent for maths and 26 per cent, 9 per cent and 6 per cent for language achievement So, especially in schools with a large number of ethnic minority students there are large differences in language achievement between schools In both other categories of schools the differences are larger for maths than for language achievement

4.5 Results

To explain the differences in maths and language achievement, the school and classroom variables were specified in the multi-level models, per category of school separately Only a few school and classroom characteristics can explain differences between schools Their effects are not very stable across the two school subjects and across the three categories of schools

Table 2 summarises the significant results in each category of schools

Out of 9 school level characteristics, 5 have significant effects but the effects are not always as expected. Some of the effects on achievement turn out to be negative (educational leadership, evaluation system) and sometimes the effects differ from one category of schools to another. Four variables, team cohesion, emphasis on achievement, aspirations and optimism about enhancing educational opportunities, have no significant effects.

Roughly the same pattern emerges for the classroom level characteristics. Out of 12 characteristics, 8 have significant effects but some effects are negative (differentiation, minimum goals, frequency of homework) or mixed (emphasis on cognitive skills) Four classroom variables have no significant effects on achievement. These are time spent on maths/language, feedback, task control, and time spent on homework.

Only two positive effects of variables show up more than two times and these both concern classroom variables· the textbooks that are used and the implementation of textbooks These effects mean that some text-

TABLE 2
Summary of Variables with Significant Effects on Student Achievement, Per Subject and Per Category of Schools

School/classroom characteristics	*> 30% ethn. min.*		*> 50% Dutch low SES*		*> 50% middle/high SES*	
	language	*maths*	*language*	*maths*	*language*	*maths*
-educational leadership					–	–
-rules		+				
-evaluation system			–			
-appointments with parents				+	+	
-motivation teachers					–	
-allocation of time		+		+		
-differentiation				–		
-minimum goals						–
-frequency of homework					–	
-add instruction					+	
-emphasis on cogn. skills	–			+		+
-textbooks used	+	+	+			
-implementation textbooks		+		+	+	+

books are better than others and that the more content of the textbooks is covered during the school year, the higher the achievement will be Three variables have significant positive effects which show up twice: appointments with parents, emphasis on achievement and allocation of time within lessons.

The effects are not the same for three categories of schools. This implies that the characteristics in the Creemers model do not always have the same effects on student achievement Their effects are partly dependent on the population in terms of socio-economic background and ethnicity

4.6 Conclusions

The results of this study show that some but not all of the variables of the Creemers model are supported by the data with respect to their general effects (in several categories of schools) and that differential effects do occur in different categories of schools The variables that are supported the most are the core variables of the model. opportunity to learn (as measured by the textbooks used and the implementation of the textbooks) and time for learning (as measured by the allocation of time within lessons) Time for learning is especially important in schools with disadvantaged student populations, while opportunity to learn is equally important in all three categories of schools. The textbooks that are used seem to be the most important in schools with a high number of ethnic minority students.

Additional analyses are planned to find out whether the effects of textbooks are related to the intelligence of students. The contents of the textbooks will be analysed as well to see whether some textbooks offer more opportunity to learn, are more structured, contain more advance organisers, etcetera These analyses are important to relate the effects of textbooks in more detail to variables in the educational effectiveness model

5. THE EFFECTS OF SCHOOL LEVEL AND CLASSROOM LEVEL CHARACTERISTICS ON ACHIEVEMENT AND METACOGNITIVE SKILLS OF STUDENTS

Research in the field of educational effectiveness is often criticised because of its exclusive focus on student achievement in the basic skills, i.e , reading, language, and mathematics Critics argue that studies are too narrowly concentrating on these kinds of skills as well as on the limited set of teacher performances thought to enhance these skills. As far as the classroom level is concerned, research mainly focuses on elements of direct instruction, with the teacher in a directive role and the students in a passive role (Rosenshine & Stevens, 1986) Effectiveness research, critics say, should pay more attention to other types of skills, such as metacognitive skills, and to other types of teacher behaviour (Veenman 1992).

Teachers are thought to gradually change their roles to more supportive ones, while students are considered active learners, constructing their own learning processes.

Researchers in the field of learning and instruction have developed some new instructional models such as reciprocal teaching (Brown & Palincsar 1989, Rosenshine & Meister 1994), procedural facilitation (Scardamalia & Bereiter 1985), modelling (Schoenfeld 1985), and cognitive apprenticeship (Collins, Brown & Newman 1989) Several small-scale studies show positive effects of these instructional models on metacognitive skills, defined as the decisions that students take before, during and after learning (Resnick 1989, Boekaerts & Simons 1993; Simons 1995).

5.1 Research Questions

This study integrated ideas and findings from both the educational effectiveness domain and the domain of learning and instruction, to answer two research questions

1 *What are the effects of effectiveness characteristics and characteristics of instructional models on student achievement?*

2 *What are the effects of effectiveness characteristics and characteristics of instructional models on metacognitive skills?*

Multi-level analyses were performed to answer these questions The analyses included three levels students nested within teachers nested within schools

5 2 Sample

The study made use of a subsample of data collected in a large cohort study in Dutch secondary education The data that were re-analysed in this study pertain to 3700 students in their first year of secondary education, 224 teachers who teach Dutch language or mathematics, and 136 school principals. The data were collected in 1993.

The dependent variables were student achievement in Dutch language and mathematics, and student metacognitive skills (corrected for intelligence, gender, achievement motivation, school well-being, ideas of students about their future and parental control). Metacognitive skills were measured by means of a questionnaire of 12 items

The effectiveness variables at the classroom level were 19 indicators of characteristics Several of these variables are represented in the Creemers model, others are related to constructs of this model Examples are opportunity to learn, goal setting, time for learning, homework, clarity of presentation, support of the teacher, and orderly classroom environment

Additionally, 11 indicators of the instructional models were measured such as student cooperation, enhancing transfer, reflecting on subject contents, and attitude of teachers towards student's capabilities to regulate their own learning processes

At the school level, a total of 10 indicators such as school type, school size, rules, student support systems, evaluation and control of student truancy were measured

5.3 Results

Concerning the effects on achievement, 8 out of 19 effectiveness characteristics have effects on maths and/or language achievement. These characteristics are time for learning, goals of homework, activation of student knowledge, clarity of presentation, assignments, teacher support, checking on assignments by students and orderly classroom environment However, only clarity of presentation and orderly environment have positive effects on both language and maths achievement

Only 1 out of the 11 characteristics of new instructional models shows positive effects on achievement: the atmosphere in the class, indicating the way that the teacher and the students interact

Concerning the effects on metacognitive skills, 5 out of 19 effectiveness characteristics have effects. These characteristics are opportunity to learn, frequency of homework, goals of homework, discussing assignments and orderly classroom environment. Most of these characteristics have positive effects, with the exception of the homework variables.

Only 1 out of the 11 characteristics of new instructional models, students working together in groups, shows effects on metacognitive skills,

TABLE 3
Effects of Classroom and School Level Factors on Language(L) and Math(M) Achievement and on Metacognitive Skills (MC) *

dependent variable	L	MC	M	MC
grand mean	11.7	25 3	10 5	25 2
classroom level factors				
effectiveness characteristics				
opportunity to learn		02		02
–time for learning			–0 4	
–frequency of homework		–0.5		– 7
–homework		01		
–goals of homework			– 09	– 06
–activation of knowledge			– 2	
–clarity of presentation	1		2	
–assignments	– 01			
teacher support	– 06			
–checking on assignments (st)	– 01			
–discussing assignments		01		
–orderly classroom environment	.6	3	6	
instructional models				
–students in groups				– 23
–class atmosphere	3			
improvement of the fit of the model, compared to the model including only the student factors	yes	yes	yes	yes

* MC appears twice because the analyses were performed separately for language teachers and maths teachers Only characteristics with one or more significant effects are specified. The regression coefficients are corrected for the effects of student characteristics (gender, ethnicity, intelligence, achievement motivation, school well-being, ideas about the future and parental control)

and these effects turn out to be negative Table 3 gives an overview of classroom level effects

In general, the effectiveness characteristics have more effects on both student achievement and metacognitive skills than the characteristics of new instructional models However, the effects on achievement are mainly caused by other characteristics than the effects on metacognitive skills. The indicators of new instructional models hardly have any effects at all

With regard to the school level characteristics, only school type shows consistent effects on achievement and metacognitive skills Students in the "higher" levels of secondary education show higher achievement scores and higher levels of metacognitive skills, even after corrections for intelligence and other student characteristics

The percentages of variance at the school and the classroom level are much higher for achievement (22 per cent for language and mathematics after correcting for student characteristics) than for metacognitive skills (3 per cent after correcting for student characteristics. This suggests that the role of schools in the development of metacognitive skills is much smaller than their influence on student achievement.

5.4 Conclusions

The findings show that the traditional effectiveness characteristics are important for the development of metacognitive skills, and that they seem to be more important for these skills than the characteristics of the new instructional models, although these were especially designed for the development of metacognitive skills. Future research, which can pay more attention to an adequate operationalisation of both the independent and the dependent variables, will show whether these findings can be supported in other age groups and other school types.

6. THE STABILITY OF SCHOOL EFFECTS

School effectiveness research tries to explain why some schools show higher achievements levels of their students than other schools To find explanations, school and classroom characteristics are explored which might be responsible for the differences between schools Recently several comprehensive school effectiveness models were developed, such as the Creemers model. These models integrate school and classroom characteristics that are effective for student achievement The models are the conceptual basis for empirical studies in the field of educational effectiveness

The comprehensive models assume that school effects and classroom/teacher effects actually exist This assumption has not been tested empirically to its full extent Data about the stability of school effects across school years and across subject domains are lacking, at least for primary education. The dataset of the national evaluation of the Dutch Educational Priority Programme was re-analysed to gain more insight into these fundamental Questions about school effectiveness

6.1 Research questions

The research questions for this study are the following:

1. *How stable are school effects across different school years?*
2. *How stable are school effects across different grades?*
3. *How stable are school effects across different subject domains?*
4. *How stable are school effects across different school years and different subject domains?*

6.2 Data

The sample used for the evaluation of the Educational Priority Programme contains data of about 150 primary schools that are representative for the population of Dutch primary schools Within these schools, maths and Dutch language achievement of students in grades 4, 6 and 8 were measured in 1988, 1990 and 1992 (see also 3 2 and 4 2) Also data about the intelligence, SES and ethnicity of students are available In each of the grades and in each school year about 3000 students participated in the study.

Three-level multi-level analyses were applied to answer the research questions 1 and 2 The research questions 3 and 4 were answered by analysing the data by means of analysis of variance, with all data aggregated to the school level

All analyses were applied to three categories of schools.

- schools with an average student population,
- schools with a high number of Dutch low SES children,
- schools with a high number of ethnic minority students.

6.3 Results

To answer the first research question about the stability of school effects across school years, multi-level analyses were applied with a three-level model cohorts of students (for example, the grade 4 students measured respectively in 1988, 1990 and 1992) are nested within the factor time, and the factor time is nested within schools The variance at the school level, after taking into account students' individual background characteristics such as intelligence, SES and ethnicity, is considered as the stable component of school effectiveness. The variance at the level of the factor time is considered as the unstable component.

The results of the analyses for the schools with an average student population show that for mathematics as well as for language achievement, the stable component is a bit larger than the unstable component in grades 4 and 8, while for achievement in grade 6, the unstable component is twice as large as the stable component. So schools are more stable across school years for the achievement of students in grades 4 and 8 than for the achievements in grade 6. Striking is that the stability across school years is smaller in the schools with a high number of Dutch low SES students than in the schools with an average student population. The stability in schools with a high number of ethnic minority students in turn is smaller than in schools with a high number of Dutch low SES students (see Table 4).

TABLE 4
Stable and Unstable Component in the Stability of School Effects

	Mathematics			Language		
	Cat 1	Cat 2	Cat 3	Cat 1	Cat 2	Cat 3
Variance student level	63.21	77.44	72.69	65.24	81.24	85.26
Variance time	2.15	4.61	8.29	3.10	4.96	9.35
Variance school level	4.16	2.65	1.54	3.21	5.50	1.96

Cat 1 = schools with an average student population
Cat 2 = schools with a large number of Dutch low SES students
Cat 3 = schools with a large number of ethnic minority students

In Table 4, the variances at the student, time and school level are presented for maths and language achievement in grade 8. In the first category of schools, the stable component for maths (the variance at the school level) is twice as large as the unstable component (the variance in time). For language both components are nearly equal. In the schools in the second category, the unstable component for maths is twice as large as the stable component. Again, both components are almost equal for language. In the third category of schools, the unstable component is five times as large as the unstable component, both for maths and for language.

To answer the second research question about the stability of school effects across grades, again three-level analyses were applied. This time though students were nested within grades (4, 6 and 8), and grades were nested within schools. The analyses were carried out per subject and school year.

In each school year, the variance between grades is much larger than the variance between schools So the differences between schools are smaller than the differences between grades—and thus between teaches–within schools This is so in all three categories of schools

To answer the research questions 3 and 4 with respect to the stability of school effects across subjects and across subjects and school years, the data were analysed with analysis of variance with the data aggregated to the school level School, subject (mathematics and language) and school year are the independent variables The dependent variables are the average school scores per subject

We are interested in the main effect of school, the interaction effect school x subject and the interaction effect school × subject × school year These effects offer estimations of the stability of the school effect with respect to both subjects and an estimation of the instability of the school effect between the subjects.

The results show a clear overall school effect, but also a subject specific effect. So schools are not stable in their effects across subjects Besides, there is a large interaction effect of subject x school year within schools This means that the subject effects are not stable across school years. These results appear for all three categories of schools

6.4 Conclusions

The results of this study lead to two main conclusions The first conclusion is that the effectiveness of schools is not very stable across grades and school years This conclusion supports the assumption that teacher effects are more substantial than school effects. Secondly, teachers are not necessarily effective for all subjects

The theoretical implications of this study are that educational effectiveness models should concentrate on variables at the classroom level The Creemers model puts the classroom level rightly in the centre of the model, as can be concluded after the results of this study Effects of higher levels such as the school and the context levels are mediated by the classroom level.

The classroom variables should not only reflect general instructional processes within classrooms, but also more subject-specific characteristics of instruction The current model does not provide such characteristics This study, which was only focusing on the stability of effects, cannot tell which exact characteristics should be specifically included for different subjects in the effectiveness model. The study can only point at the necessity of more attention to the different school subjects in effectiveness research

The finding that schools with a high number of children with disadvantaged backgrounds are less stable with respect to student achievement than other schools deserves specific research into what happens in these schools

7. CONCLUDING REMARKS

7.1 Summary of the Findings

The main conclusions of the four studies that were presented are the following·

- Some of the characteristics at the classroom and the school levels in the Creemers model show the expected (positive) effects on achievement However, not all of the effects are in the expected direction Sometimes, negative effects are found Even more striking is the instability of effects of characteristics across different dependent variables and across school subjects
- There is some empirical support for the consistency principle at the classroom level and at the school level Some teachers and school can be considered more consistent than others However, more consistency does not lead automatically to higher effectiveness in terms of student achievement
- Some but not all of the variables of the model are supported by the data with respect to their overall effects in several categories of schools. The variables that are supported the most are the core variables of the model opportunity to learn and time for learning Differential effects do occur in different categories of schools, dependent on the composition of the student population in terms of socio-economic background and ethnicity. Time for learning is especially important in schools with disadvantaged student populations.
- The "traditional" effectivenes characteristics are important for the development of metacognitive skills, and they seem to be more important for these skills than the characteristics of the new instructional models even though these were especially designed for the development of metacognitive skills.
- The effectiveness of schools is not very stable across grades and school years Teacher effects are more substantial than school effects, although teachers are not necessarily effective for all subjects

To summarise, the findings from the four studies support some elements of the Creemers model such as the consistency principle, the central position of the classroom level, the importance of time for learning and opportunity to learn, and the importance of effectiveness characteristics for metacognitive skills The findings also suggest a refinement of the model, in terms of hypotheses for differential school and classroom effects Still, the results are not always easy to interpret This is mainly so when the effects of specific characteristics at the classroom and the school level are at stake The effects on achievement and metacognitive skills are not very stable across dependent variables and they are not always positive

7.2 Implications for the Effectiveness Model

The results of the four studies can lead to various implications for the effectiveness model, dependent on the way that they are interpreted

1 The correct effectiveness characteristics were studied, but they were studied in the imperfectly. Therefore, the model does not need to be changed
2. The correct effectiveness characteristics were studied, but more characteristics should have been studied Here, too, the model itself does not need to be changed.
3 Different effectiveness characteristics should have been studied When this is true, the model needs changes

Correct Characteristics Were Studied Imperfectly

All of the results of the four studies were obtained by re-analysing large-scale datasets (see also the first section) The data were collected in survey studies, and these have some drawbacks. For example, all of the data were collected by means of standardised tests and written questionnaires The type of measurement can lead to social desirability when teachers and principals answer the questionnaires, thereby reducing the reliability of the findings Moreover, some variables were operationalised rather rudimentary, because of practical constraints This holds especially for the key constructs of the model, time for learning and opportunity to learn Concerning the dependent variables it is possible that the test-curriculum overlap is not optimal. The language and achievement tests may not have measured the content covered by the teachers of the students Differences between schools and teachers may more easily show when achievement is measured by curriculum-specific tests (Slavin 1987) or by means of other methods which reflect better what actually happens in schools and classrooms (Rowe et al. 1994).

Summarising, there are reasons to conclude that the correct characteristics were studied but that they were not studied optimally. Because of these considerations, changes in the effectiveness model are not necessary as yet First, the concepts of the model should be more adequately operationalised

More Characteristics Should Have Been Studied

The datasets that were used for the re-analyses cover the Creemers model only partially This is particularly so for the characteristics at the classroom level, such as the behaviour of the teacher Detailed information about the curricula that are used is not available, and data about the way the teacher instructs the children are either way, globally measured or not measured due to the practical constraints of measurement by questionnaires Characteristics such as high expectations, structuring the content, questioning, etc , were not present in the datasets When the quality of instruction at the classroom level would have been measured, the findings might have been different In addition, the datasets did not contain any information at all about two essential concepts of the model· time on task and opportunities to learn actually used by students

The studies would have more impact for the model when these concepts would have been integrated too

Different Characteristics Should Have Been Studied

The instability of effects of schools and classroom characteristics, reported in some of the studies, may have been caused by imperfect operationalisations and an imperfect coverage of constructs of the model However, the findings may be due to the effects of characteristics that have not been studied at all and that are not represented in the model either. It is possible that other variables are more important for achievement than the characteristics in the model, or other variables might influence the characteristics in the model in such a way that they do no longer show linear effects on achievement. According to this contingency-hypothesis, variables such as the recruitment of teachers could be more important in the end than classroom variables (Teddlie 1994). Theoretically, it is also possible that student level variables can exert these types of influences

When the contingency-hypothesis would hold, the characteristics in the effectiveness model turn out to be overarched by other, more influential variables. As a consequence, the model could be expanded to encompass these more influential variables However, the character of the model as an *educational* effectiveness model could be questioned.

The studies presented in this contribution are a first step in the process of testing the empirical validity of the effectiveness model Because of the drawbacks of these studies, it is now necessary to start other types of research such as experiments and quasi-experiments. More research is needed to study the effectiveness characteristics in a more refined way and especially to study the role of the key concepts in the model Of special importance are international comparative studies, which can provide information on factors and variables that are stable between countries, and on the influences of the context on educational effectiveness Until then, a further expansion of the model should not be undertaken

Appendix A
Curriculum, Classroom Processes and School Effectiveness

Wijnand Th J.G Hoeben

1 Curriculum Research: An Introduction

To interpret curriculum research in terms of educational effectiveness, the curriculum a documented (with respect to separate or integral texts documenting goals, contents, m terial and procedures for evaluation of student outcomes, feedback and corrective instru tion) has to be distinguished from the curriculum in operation (with respect to classroo processes such as grouping procedures, teacher behaviour and/or curriculum impleme tation) The operational curriculum may be derived from various research on curriculu implementation

The variables regarding quantity and quality of instruction in productivity mode (such as Walberg 1984) have to be specified Quantity of instruction may be specified the amount of time students engage in learning For the purposes of interpretation curriculum research this variable has to be further specified as time allocated in the scho curriculum and as time on task in the operational curriculum The quality of instructi may be seen as a concept that includes several aspects, among which psychological ar curricular aspects To specify the quality of instruction we refer to the following variable opportunity to learn, students' engagement in learning, students' experience of succe pacing, structuring, and evaluation and feedback The specified quality variables may al distinguish between the curriculum as documented and the curriculum in operation.

2 A Model of Curriculum Productivity

To describe and explain various properties of curricula and their implementation and predict their outcomes, a theory may be developed that links quality requirements curricula with educational effectiveness. A theory of curricula as feedback systems and theory of educational productivity and effective instruction may be taken together as framework for the interpretation of curriculum research and effectiveness research T framework furthermore may be specified for different levels of the educational system (t relevance of which may vary across countries) and may be supplemented with releva conditions at the several levels

2 1 *Curricula as Feedback Systems*

Tyler formulated in 1949 the basic principles of curriculum and instruction, that are nowadays recognised as fundamental to the craft. According to these principles curriculum design is determined by four key questions.

- What educational purposes should the school seek to attain?
- How can learning experiences be selected which are likely to be useful in attaining these objectives?
- How can these learning experiences be organised for effective instruction?
- How can the effectiveness of learning experiences be evaluated?

Curricula designed according to these principles are true feedback systems The basic explanation of the productivity of curricula may well be found in the feedback loops inherent in curriculum design Along with explicitness and ordering of the goals, evaluation, feedback and corrective instruction in the curriculum are important features of the effective classroom (Creemers 1994).

For a curriculum to be productive, it has to be designed and implemented as a feedback system The determination of purposes and the evaluation of effectiveness are consequently the cornerstones of a curriculum Changes in these elements affect the essentials of a curriculum While teachers implement a curriculum, their feedback on goal attainment may cause them to change the selection and organisation of learning experiences, thereby adapting the curriculum without affecting its essentials Changing the goals or the evaluation criteria and procedures will, however, change the direction a curriculum will be taking

A curriculum as a feedback system facilitates, stimulates and enhances the implementation of teaching and instruction as feedback models. This also requires teaching behaviours that conform to the feedback models of effective instruction Theories of learning and instruction stress the importance of evaluating or monitoring the learning progress (feedback models of teaching) Regular evaluation is a variable of effective schooling in different models of effectiveness research. The procedures teachers use to evaluate and monitor the progress of their students, and the regularity with which they are used, will determine their decisions on the sufficiency of the learning progress. In doing so they influence other variables of curriculum implementation, such as differentiation, allocation of time, content coverage, and pacing

2 2 *Empirical Results*

Meta-analyses conclude that curricula are indeed productive characteristics They found an average correlation of old and new curricula with achievement of about 0 20 (Fraser et al 1987) This finding is, however, not a comprehensive estimate of the potential contribution of curriculum design and curriculum implementation to educational productivity Most of the variance in student achievement is explained by individual differences between students, like differences in aptitude, SES, and language spoken at home Individual differences determine the way students learn and how they can profit from a curriculum Although learning may be influenced by the curriculum, it still has to be done by the students themselves

In a review of Dutch studies of curriculum evaluation (Hoeben 1994) the individual differences between students were demonstrated to explain more variance than the other variables Curriculum evaluation studies that control for variables of the students, are frequently forced to revise an original estimate of the curriculum impact, the original estimate being based on exploratory research and the initial aspirations of the curriculum developers In the same review textbooks used in the curriculum, time allocated and time spent on teaching and learning the curriculum, coverage of the curricular content, and opportunity to learn were demonstrated to have impact on the attainment level. In some of the studies the impact of these variables proved to be differentiated according to subject These variables are in fact variables of the curriculum implementation

3 Effective Characteristics of the Curriculum

3 1 *Objectives of the Curriculum*

The purposes and the content of a curriculum give rise to the specification of objectives Mostly, objectives are formulated as operations students have to perform on the content The goals of the curriculum are thereby formulated in an operational manner allowing for two further operational procedures· the selection and organisation of learning experiences on the one hand and the evaluation of their effectiveness on the other hand Specification of objectives enhances the teachers' expectations of students to attain them Supplementary to the specification of objectives the teachers' expectation of students has been demonstrated to contribute to their educational success

An adequate curriculum for low SES students contains also an emphasis on the acquisition of basic skills along with high expectations of student performances These are longstanding effective schools correlates Dutch research demonstrated also that students of linguistic minorities in schools with a strong emphasis on basic skills achieve better than such students in schools with less emphasis on basic skills.

3 2 *Structuring of the Curriculum*

Bringing structure in the curriculum is meant to facilitate the structuring of the students' opportunities to learn, that is structuring the processes of learning and instruction in order to let the students know what they have to do and what they have to learn This means bringing structure in the educational content and the educational objectives Inconsistencies in content and objectives may prove to be a sufficient explanation of achievement problems.

An adequately structured curriculum has a clear arrangement of the subject matter in small units that may be mastered by the students, allows for continual monitoring of the learning process with the help of tests and observations, guarantees adequate learning time, and, in the case of inadequate achievements, provides the teachers with possibilities to let students as yet master the content unit A Dutch educational opportunities project provided curricula for disadvantaged students that were structured along those principles, the aims of the project, viz, achievements of the disadvantaged students as high as the average achievement of Dutch students in general, were, however, only approximated

3 3 *Evaluation and Feedback in the Curriculum*

Evaluation and feedback are of course prerequisites of curricula as feedback systems They may also be regarded as prerequisites in maintaining high expectations of student performance Student evaluation is a prerequisite of programmes with the strongest instructional effects on learning, like reinforcement, acceleration, cues and feedback, and other programmes that build on the strategy of mastery learning It is also a consistent and strong correlate of effective schools Providing for evaluation and feedback by providing adequate assessment procedures and procedures to decide on corrective instruction, is a characteristic of productive curricula

Although Dutch replications of effective schools research in general have ambiguous results, they are consistent in demonstrating positive effects of evaluation and feedback Leadership for instance has no effect or only weak effects Also other effective schools correlates are ambiguously replicated in Dutch research Only frequent monitoring in order to feedback and reinforce student progress on the one hand and a productive school climate on the other hand are consistent effective schools correlates in Dutch education

Teacher practices in student evaluation, however, are frequently inadequate Research demonstrated these practices to be especially inadequate with regard to the assessment of achievement If evaluation practices are inadequate, feedback and reinforcement of student progress will also be inadequate There is also a lack of agreement among researchers and analysts on how to define monitoring and evaluation practices Nevertheless, adequate or inadequate and however defined, the evaluation practices are consistent effective schools correlates

Adequate student evaluation requires not only adequate assessment of their achievement, but also determining the students' prior achievement and monitoring the way they progress Curricula that are adequately structured and differentiated, provide teachers with instruments for these three kinds of evaluation Such curricula make it also clear that teachers do not implement the curriculum correctly if they do not use the provided evaluation instruments Research on differentiation demonstrates that, if teachers are so stimulated, they indeed evaluate student progress in a more adequate way and students achieve better

3 4 *Differentiation of the Curriculum*

Pacing is a variable that will be stimulated by adequate differentiation of the curriculum Pacing means adapting the pace of instruction to the students' pace of learning The teacher has to speed up or slow down the pace according to the students' aptitudes The ultimate consequence of this concept seems to be personalised and individualised instruction Although curriculum programmes with personalised and individualised instruction have strong effects, such programmes seem to be practical only in small groups A more moderate differentiation between groups of students instead of between individual students seems to be more practical Such differentiation leads to adaptive instruction and uses techniques of personalised instruction combined with techniques of working in small groups, programmes of adaptive instruction also have strong effects

Dutch research into differentiation of the curriculum and adaptive instruction shows ambiguous results In a series of studies in mathematics education a new curriculum with adaptive instruction and cooperative learning in small groups was compared with a traditional curriculum with whole class teaching The degree of implementation of both curricula was determined by means of students' perceptions of the learning environment and by means of observations Expected differences in student and teacher behaviour between an experimental and a traditional curriculum were found to be significant The study demonstrated different implementation profiles in both conditions The implementation process in the experimental condition was significantly more in accordance with design than the implementation in the control condition The learning achievements were also higher in the experimental condition In addition the studies found differences within the experimental condition For example, the time allocated to different forms of instruction (whole class teaching, group work and independent study) varied to a certain degree Differences were also found in time on task These differences corresponded with the hypothesis the more the curriculum was implemented the better the learning achievement

In contrast, research of differentiation in Dutch elementary schools demonstrated higher average achievement in non-differentiated classrooms compared with students who were differentiated along individual lines or along lines of prior achievement Only curricula that were structured according to the concept of mastery learning were demonstrated to have positive effects on average achievement A probable explanation of these ambiguous results of differentiation research may be found in efficient classroom management, especially the management of students' time on task, and in the provision of continuous monitoring instruments to evaluate students' progress while maintaining high expectations of performance These characteristics are inherent in the differentiated curricula that were demonstrated to be effective, while time management and evaluation of the students' progress proved to be defective in cases of differentiated but ineffective curricula

As an adequate structure of the curriculum influences the students' opportunities to learn, so an adequate differentiation of the curriculum influences the students' engagement in learning An adequate differentiation requires an arrangement of the subject matter in small units, a provision of tests and other instruments for continuous monitoring of students' progress, and a provision with curriculum materials for recapitulation or enrichment A curriculum that is differentiated along those lines, will also provide teachers with opportunities for adequate management of students' time on task For low SES students and students of linguistic minorities an emphasis on student acquisition of basic skills and the maintenance of high standards will be additional quality requirements of differentiated curricula

4 Implementation of the Curriculum

The key findings of IEA studies and of the Dutch recurrent assessment studies and comparative curriculum evaluations may be summarised from the point of view of curriculum productivity The opportunity to learn the curriculum content and the time allocated to the instruction of the curriculum content are important variables of the implemented curriculum Regardless of the curriculum as documented, they contribute in most instances to educational achievement and to the attainment of the curriculum objectives

A prerequisite of curriculum productivity is an implementation of the curriculum in order to make the instruction as effective as possible From a productivity point of view it is not necessary to choose between the several implementation perspectives (mutual adaptation, fidelity, enactment) Either schools and teachers adapt their curriculum and textbooks in order to implement effective instruction for as many as possible of their students, especially their disadvantaged students, or they develop their own school curriculum and choose curriculum materials that are geared toward effective instruction

In curriculum implementation, the content covered in the classroom is an important variable from the point of view of productivity Content coverage is determined by observing how much of the curriculum content is taught in practice and, as a consequence, how much of the content has been learned by students. Opportunity to learn is related to coverage of content, it is, however, a student variable and may at best be seen as a consequence of content coverage by the teacher Another important variable of the learning process, time on task, may also be seen as a consequence of the content coverage by the teachers Time on task is, however, also related to other variables, like students' motivation, their active involvement in learning and their experiences of success, or the teachers' packing, structuring and evaluation

Curriculum of implementation and achievement are influenced by the intellectual composition of classrooms Dutch curriculum evaluation also demonstrates the contribution of classroom composition in explaining curriculum implementation and achievement

Curriculum variables not only may determine students' opportunity to learn, but also the pacing and structuring of their learning Standards defined in terms of outcomes of the curriculum together with assessment practices determine the way students are monitored and determine their experiences of success Curriculum variables may thus explain differences in students' opportunity to learn, allocated time and time on task and thereby differences in their learning achievements

5 Quality Requirements of Curricula

Curricula foreshadow many instructional variables, like opportunity to learn, time on task, pacing, structuring, evaluation and feedback We may differentiate between the school curriculum and curriculum materials or textbooks, the last kind of curricula mostly being more concrete and specific The more specific curriculum documents are the more the foreshadow effective instructional variables and the more productive the documents

Based on the foreshadowing characteristic of curricula in this section, curriculum research was analysed and interpreted with a view to curriculum productivity It is also possible to interpret the research in the same way in order to derive quality requirements of curricula The quality requirements are implied by applying a principle of productivity: what (implementation of the) curriculum produces the most benefits in terms of personal learning, skills and examination results, costs being equal

The research may be analysed both with regard to the operational curriculum (the classroom processes of learning and instruction) and with regard to the implementation processes, whereby curriculum documents are transformed into operational curricula The analysis focuses on three concepts of curriculum and instruction the structure of the curriculum content, the differentiation within the curriculum, and the interrelated elements of evaluation, feedback and reinforcement within the curriculum The following conclusions seem to be valid

Analysing characteristics of the curriculum documents themselves we may conclude on some variables that have impact Specified objectives (especially of basic skills), an adequate structure, documentary provisions for differentiation along lines of mastery learning and provisions for regular evaluation and feedback contribute to productive curricula These may be regarded as quality requirements of curricula

In implementation these productive characteristics tend to reinforce each other Furthermore, they stimulate teachers to pace, to structure and to monitor the learning of their students in order to provide them with adequate opportunities to learn, engage them in learning and provide them with experiences of success. These effects on teachers may be enhanced by the teachers' in-service education

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Research on Classroom Processes at Primary Stage

Recent Indian Studies

Life in Indian Classrooms: The Influence of Culture and Caste

Prema Clarke and Bruce Fuller

The study examines the extent of variability in the use of instructional tools and pedagogical patterns employed by teachers across 50 classrooms in Madras, India and the possibility of variation being systematically organised according to the socio-economic status (SES) and caste background of students.

Employing purposefully stratified "volunteer sample or sample of convenience" three categories of school; private schools (Type I, N=13 classrooms), semi-private schools (Type II N = 20 Classrooms), and state and municipal schools (Type III, N = 17 classrooms) constituted the sample of the study. The sample included 31 female and 19 male teachers. All the classroom activities were videotaped and analysed qualitatively and quantitatively

The results highlighted both the commonalities and variations in classrooms and pedagogical practices among three types of school population. The three types of schools were using lecturing, the textbook, and questioning The variations in three types of school population was related to physical conditions and pedagogical practices Among the prevalent pedagogical practices, the study reported greater interaction between teachers and students in private schools as compared to government and municipal schools. In private schools, teachers' questions were mostly addressed to individual students, while in municipal schools the teachers addressed their questions to students as a group Further, private schools witnessed a lot of eye-to-eye contact between teachers and students, which was almost absent in municipal schools.

The study has emphasised the need to give up the "top-down" approach in implementing the policy initiatives and, instead, recommended to take into consideration teachers' culturally defined explicit and implicit relationship to pedagogy It is stressed that in the absence of this approach reform in teaching and learning is unlikely

Classroom research in developing countries remains largely dominated by the production-function metaphor originally rooted in studies of North American classrooms (Gage and Needels 1989). Research based on this framework attempts to identify optimum levels of instructional inputs and universally effective teaching practices which boost student achievement The production-function model has also been used to evaluate the effects of teacher training and pedagogical innovations Given the urgent imperative to raise basic literacy and student achievement with scarce resources, this paradigm has provided a useful and timely method for studying certain aspects of Third World classrooms.

Over the past decade, however, the limitations of this paradigm have led classroom researchers in the West to employ a wider variety of approaches to the study of classrooms. These strategies stem from theoretical frameworks and methods found in different disciplines· anthropology, psychology and sociolinguistics Researchers in these fields recognise the multiple dimensions of classroom life, including the roles played by teachers' experiences and perceptions, students' attitudes and expectations, and the broader environment in which the classroom is situated. Recently a number of qualitative and quantitative studies have more richly described classrooms in the West and have helped to explain their variability. Notably, these studies recognise that instructional tools and teaching practices are neither cultureless nor technical instruments which hold universal meaning. Teachers and students enter the classroom with culturally situated expectations about legitimate forms of social participation, adult-child authority, and the role of textbooks and other instructional materials. Altering these institutionalised classroom scripts and rituals are far more difficult than production-function devotes would have it.

These theoretical and empirical developments are beginning to influence classroom studies in many developing countries Classroom activity is now being located within the complex cultural environment surrounding these classrooms For example, Prophet and Rowell's research (1993) on science classrooms in Botswana records the importance given by teachers to correct scientific terminology rather than on facilitating conceptual understanding. These ovserved pedagogical routines are then associated with culturally situated notions of teaching and learning which include the teacher's ideas of the "objective" nature of subject knowledge and the insignificance of their own personal knowledge.

Lindstrom's study (1990) in Papua New Guinea similarly reveals how theories of knowledge in Pacific cultures can mediate classroom activity. These theories include notions of who can produce knowledge, in addition to how knowledge can be circulated and appropriated. For instance the author illustrates how "copyright laws" relating to the production of knowledge in the society can be enacted in the classroom. Knowledge belongs to the individual in Papua New Guinean culture. On the one hand, if a student uses an illustration in class, a fellow student is hesitant about dicussing this illustration, since it belongs to the student who used it. On the other hand, whatever a student expresses in class, whether it be hearsay or a personal statement, is acceptable knowledge because an individual says so

Our study of 50 secondary school classrooms in the city of Madras, south India springs from this more culturally situated view of classrooms in developing countries. We begin by posing two research questions regarding the variability in the classroom's social rules and pedagogy, pertinent in both first and Third World contexts

The first question focuses on how much variability is there in the use of instructional tools and pedagogical patterns employed by teachers across the fifty classrooms This emphasis is in line with research traditions in the West which illuminate the homogeneity, consistency and simplicity of pedagogical routines in the classroom These studies stressing uniformity in classroom practices arise out of the "World institution theory of mass education", put forward by Meyer et al (1979) Meyer et al put forward the theory that mass education is a universal and rational instrument used to construct the secular individual devoted to the building up of the modern nation-state Proponents of this theory claim that the cultural content, purposes, structure funding and general control of education is uniform across nations. However, our study goes further by attempting to situate the common instructional practices within the cultural context and meanings in the broader society. Our study conveys possible ways in which pedagogy is culturally constructed

Our second research question concerns the possibility of variation being systematically organised according to the socio-economic status (SES) and possibly, caste backgrounds of students. In other words, we are interested in whether variation in instructional tools and pedagogical patterns is ordered according to three types of classrooms representing three school populations varying in socio-economic status. Therefore, in addition to portraying the general character of classroom life in south India, we also seek to uncover the more subtle differences in instructional inputs and pedagogical behaviours exhibited among the three types of classrooms in a specific local context Similar research in the West has been initiated by scholars such as Ray (Rist 1970) J. Carew and S Lightfoot (1979), and more recently, Hugh Mehan (1992) These studies, taken together, expose either the conscious or unconscious differences in teacher's behaviour towards their students and its effect on student learning. Robinson's recent study (1994) in South Korea also portrays ways in which teacher expectation of student performance is based on the perceived economic and social status of the student in South Korean society Using both quantitative and ethnographic methods Robinson demonstrates how teachers' expectations are translated into differential behaviour of a teacher towards students during instruction Similar to the above studies, our study of classrooms in

Madras, attempts to convey the possible existence of culture-specific variation among classrooms and pedagogy according to institutional and community stratification

To summarise the above discussion, our study suggests that both the general character of classrooms, and the variation among the classrooms could be circumscribed by the cultural environment within which classrooms are situated. Characteristic levels of authority, local forms of knowledge, and social participation may explain normative pedagogical practices, moreover, it is likely that the variability among the three types of classrooms may be ordered according to principles of social stratification characteristic of society in Tamilnadu Further, rather than focusing on student achievement, this analysis of classroom activity illuminates the culturally confined ways in which student learning is actually constructed.

We begin by providing a brief introduction to the Indian cultural context Next we describe our research design and findings, followed by a discussion of the implications of this study for reform in teaching and learning in India

THE INDIAN CONTEXT

Secular education was brought to the sub-continent by the British in the 18th century. Prior to the 18th century, children were mostly educated within the confines of religious institutions In contemporary India, education is a "concurrent subject" falling under the jurisdiction of both state and central governments (Dyer 1994, Tilak 1990) In this section, we layout relevant cultural elements emanating from previous research within the Indian context and its possible influence on classroom activity.

The teacher's pivotal and authoritative role within the classroom in India is one area in which the influence of culturally defined patterns of hierarchical interaction is evident. In fact, Krishna Kumar's historical study (1991) traces the dominance of the teacher in the classroom as a natural outcome of the respect and authority that is given to age and experience within the religious, social and cultural ethos of the country From a developmental standpoint, authority conferred on the adult by children in Indian society is described by Sudhir Kakar, a leading Indian psychologist Generally, until a child is around five years old adults accede to all that a child wants After age five the roles reverse: the child is required to respect and obey the adult.[1] It is likely that the teachers themselves are aware of and constrained by these tacit understandings of authoritative adult roles within society and tend to fashion their pedagogy and classroom organisation accordingly[2]

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[1] Kakar's study (1984) of the depiction of authority structures in 31 stories in Indian primary school textbooks, did not find a single portrayal of an egalitarian relationship between adults and children See also Stanley Kurtz's recent study (1992) of childhood in India

Related to this respect for adults is the prevalent notion that knowledge is the domain reserved for and controlled by the guru, the high caste, and the elders of the community (Kumar 1991) The teacher, who falls into this category, is also viewed as the possessor of all knowledge

The teacher's relationship to the textbook is another area in which culture circumscribes classroom activity The teacher uses the textbook as her or his complete source of knowledge; thus it becomes the icon of knowledge within the classroom.[3] Kumar defines "textbook culture" in India. "The basic norm of the culture is to treat the prescribed textbook as the *de facto* curriculum, rather than as an aid" (Kumar, 1988, p 64) Teachers perceive their primary task as illuminating the content of the "textbook" to their students and helping them memorise the text. Moreover, the textbook contains the entire subject matter students must master for the Secondary School Leaving Certificate exams at the end of the tenth grade, clearly the teacher connects the "illuminating" role with the exams

Having said this, parallels between the current position and role of the textbook in the classroom and those of religious texts in precolonial education also points to the possible existence of ingrained culturally constructed associations with "written text " In pre-colonial education, as descrided by Kumar, religious education consisted of memorising religious texts, students learned the joy of reading the test and deriving meaning from it, rather than personal interpretation.[4] Very likely, the culturally constructed pedagogical relationship to "the text" has persisted. Further, the primacy of "the text" could also be seen as influencing the authoritative and uncreative nature of exams.

Another distinctive feature of Indian society also affects education· the predominance of the caste structure (Kolenda 1978; Dumont 1979; Milner

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[2] Recent research in the field of "Teacher Thinking" in the West (Feiman-Nemser 1983; Carter 1990) has illustrated the power and constraining nature of early socialisation models of teaching on the way a teacher constructs his or her own model of teaching

[3] J. Zahorik (1990) suggests three ways in which textbooks are utilised in the U S , which influences the communication of knowledge by the teacher He identifies these three styles as: coverage of content, extension and expansion of knowledge, and the kindling of new ways of thinking

[4] Kumar (1991) attributes the current dominance of the text and the emphasis on memorisation of the text as a response to the introduction of "foreign knowledge" by the coloniser (p 63). However, there are also clear similarities in how the teachers now relate to the text and pre-colonial pedagogy, as his own descriptions of pre-colonial pedagogy indicates

1994)[5] Each person's identity and position in India is informed by the caste to which he or she belongs "Caste in other words, is not an abstract, hidden principle of social organisation; it is a visible dimension of everyday life .. Even now, when caste distinctions carry less weight than they used to, they show no sign of fading away completely. This is true in towns and in cities as well, in spite of the fact that so much urban social activity involves anonymous strangers" (Fuller 1992, p. 13) Further, and unique to the Indian context, the institution of caste interacts with the secular dimensions of "status, class and power" (Gupta 1991, p. 304) Myron Weiner, in a recent study (1991) on the relationship between the child and the state in India, describes the Indian government's inability to deal with the growing number of illiterates and drop-outs, and the prevalence of child labour He ascribes these problems to bureaucrats' belief in the social ordering of Indian society Educating substantial numbers in the lower castes is seen as a threat to the caste organised nature of Indian society.

RESEARCH DESIGN

We describe the two main component of our research design: the choice and nature of the three types of classrooms basic to this study and the instruments and methodology used to study the three types of classrooms.

Sample

In order to address our questions on variation in pedagogical practice within the Indian context, we first identified defferent school populations in the city of Madras in the state of Tamilnadu, south India We decided to base our study on a purposefully stratified "volunteer sample or sample of convenience" (Anderson et al. 1989, p. 6) representing three types of school populations.[6] Our sample includes classrooms from three major urban socio-economic sectors[7] Thirteen classrooms (Type I) represent private schools, semi-aided by the state[8] Most of the students in this type of school come from the upper middle and middle class Twenty classes (Type II) come from semi-private schools Semi-private means that the physical structures are constructed by individuals or private institutions while the school operations are fully state aided with students paying no fees. Students come from the lower middle and lower classes. The remaining seventeen classrooms are from state and municipal schools (Type III) where both capital and recurring expenses are covered by the state. Education is free in this category and the entire student body come from the lowest sections of society.

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[5] While there are numerous castes and subcastes in India, Indologists refer to the four-fold caste system found in the Hindu scriptures as an "ideal model" for the Hindus who constitute 83 per cent of the population The four castes consist of the Brahmins, Kshatriyas, Vaishyas and the Sudras Outside of this system lies the Untouchable or Adi-Dravida caste. Tamilnadu society has only three castes (Beteille 1991), the Brahmins, the non-Brahmins and the Adi-Dravidas The systems of caste is also found among many non-Hindu populations in India (Fuller 1992)

[6] L. Anderson, D Ryan and B Shapiro (1989) in their comparative study of classrooms in eight countries were able to use only volunteer or convenience ones They also stated that unless it is a government study it would be impossible to obtain a randomised sample

English is the medium of instruction in all fifty classes Children from Type II and Type III classes come from homes where an Indian language is spoken, and many of the children in Type I classes come from homes where English is spoken All the schools are single-sex schools and all students wear uniforms. The sample includes thirty-one female teachers and nineteen male teachers. All of the teachers observed possess a one year teaching degree (B Ed.) which is acquired after completing an undergraduate degree The sample consists of twenty-two maths and twenty-eight English and social studies classes.

While the effects of modernisation on urban areas in India, make it difficult to characterise the schools as possessing a particular caste identity, it would be fair to say that Type III classes consisted mainly of students from the lower castes Moreover, since the three types of school populations in Madras represented by our Type I, Type II and Type III classes did correspond with socio-economic stratification, caste affiliations are also reflected.[9] Therefore, our research design, involving the study of three types of school populations, allows us to study variation and see if variation is systematically organised by caste and SES.

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[7] Schools that cater to students from the highest socio-economic background are not included in this study since only 1 per cent of the school age population attend these "public" schools (Taylor 1991) The major cross-section of the population in each state including all the students in this sample attend private, semi-private or municipal schools. Most "public" schools offer national high school certificates while private, semi-private and municipal schools offer state certificates such as the "Secondary School Leaving Certificate (SSLC)."

[8] These schools are considered private schools because fees are collected from pupils which are then used for a portion of staff salaries The state government also provides monthly grants to augment staff salaries

[9] Schools are dissuaded from recording the caste affiliations of their students. Therefore, it is difficult to ascertain the majority caste in the different schools. However, as mentioned earlier many studies (Beteille 1991) demonstrate the correlation between class and caste with the former often legitimising the latter Further, since there are only three castes in Tamilnadu, it is likely that Type III classes are constituted mainly by the Adi-Dravidas.

Instruments and Methodology

All of the fifty classes were videotaped for analysis The tapes were analysed both quantitatively and qualitatively. The instrument used for the quantitative analysis of the tapes is an adaptation of two observation instruments to the Indian context. Fuller and Snyder's observation instrument used in 1988 in 154 junior secondary school teachers in Botswana and the "Special Strategies Observation System" compiled by Teddlie et al. for use in low-income classrooms in the United States.[10] Two factors influenced our adaptation of these instruments for use on the Indian videotapes. First, neither of these instruments involved the observation of whole class sessions They included either single observations or observations of seven to ten minute segments of classroom activity Second, many of the constructs used in these questions appeared inapplicable or irrelevant to the Indian context [11]

The observation instrument consisted of three parts The first part contained general information on physical and instructional inputs in the classroom In the second part, we identified ten salient activities taking place during a class period We then examined the tapes for the sequential occurrence and length of time spent on these activities There appeared to be distinct units of questions asked by the teachers, to which answers were provided by the students, apart from all the other activities taking place in the class. Therefore, in the third part, we created two matrices in order to look at what we refer to as "question-and-answer sessions" and "the rest of the class session". We looked at the question-and-answer sessions to determine the extent of student involvement, and at the rest of the class session to identify the type and frequency of instructional tools used. Our quantitative analysis of the data consisted mainly of descriptive statistics.

The qualitative analysis involved a transcription of twelve typical class sessions, four (two maths and two English/social studies) from each of the three types, in addition to a more detailed interpretive behavioural observation of these class sessions This qualitative analysis provided in-depth information on the way teachers explained subject content and how knowledge was constructed during teacher-student interactions. In other words, while the quantitative analysis revealed the presence and use of instructional materials and "inputs," the qualitative analysis elaborated in more detail, the manner in which these material inputs were actually utilised and the meanings attached to them. The teachers also answered a questionnaire about how they prepared for the class and their perceptions of what constituted effective teaching methods in their own minds [12]

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[10] The observation instrument used in Botswana was adapted from J Stallings et al. (1978) and from Teddlie et al. (1989)

[11] For instance the presence of instructional inputs such as textbooks, notebooks and pencils/pens pertinent to the Botswana context is not an issue in classrooms in the city of Madras

Since the quantitative and qualitative findings permitted triangulation, we will report the results together in each section. The first section deals with common types of pedagogical practices seen in all fifty classrooms and the second section describes variation among the three types of classrooms.

COMMON FEATURES OF CLASSROOMS AND PEDAGOGY

In this section we first discuss the general physical characteristics of the classrooms, followed by the common pedagogical routines and social rules observed in most all classrooms

Physical Characteristics of Classrooms

We examined the use of classroom space, furniture and instructional inputs such as textbook, notebooks and teaching aids To further assess the quality of facilities and resources we examined the state of the walls and the types of posters on them (commercially manufactured, teacher produced, or student produced) In addition, we observed how students dressed, and the presence or absence of other subjects in the classroom

All classes are accommodated in concrete building. The students sit in rows, often exhibiting a uniform posture with faces turned toward the teacher and hands on the desk or in their laps The teacher's desk and chair is in front of the class. Textbooks and exercise books are used across all the classes, each student possesses his or her own textbook and notebook for each subject. Apart from these two items, students did not use any other books such as supplemental readers, reference books, dictionaries, or atlases. In the questionnaire, teachers indicate that they prepare for the lesson using reference books, magazines and teaching guides However, we observe no use of these items by any teacher during any class period.

Common Pedagogical Sequences

Two commonalities are evident across the fifty classes. the use of the textbook and the hierarchical transmission of knowledge. First, teachers use the textbook as their primary instructional tool in all of the classes Teachers hold the textbook in one hand and a piece of chalk in the other, and using the blackboard, teachers fervently and enthusiastically explain lessons in the textbook to their students In our questionnaire, teachers defined this method as the chalk-and-talk method of teaching.

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[12] These questionnaires were returned by only 36 teachers and did not contain much descriptive detail

Second, knowledge is transmitted consistently from teacher to students and rarely from student to teacher or student to student. Teachers transmit knowledge by defining "what" students should know and "how" they should know it Teachers define "what" students should know during the explanation of textbook content and "how" they should know it during "question-and answer" time, the latter being interspersed throughout the explanation of content. In maths the "what" involves leaving specific formulae necessary to solve a set of problems Students learn the exact formulae found in the textbook and no attempts are made to discuss more than one way to approach a problem or the application of other previously learned but related formulae Further formulae are rarely applied to real life situations. In English and social studies the "what" involves the assigned lesson in the textbook English teachers explain the lesson by dwelling on meanings of words, sentences or small paragraphs are explained by rearranging words or paraphrasing the text. Themes, main points, or lesson structures are rarely explicitly dealt with. Again, real life examples or personal parallels with the text are scarce.

The following excerpt from the beginning of one English class illustrates how teachers explain the textbook The lesson is about a brave deed by a person called Boyty during a war between the French and English:

T: Turn to the lesson "Lead Kindly Light." What do you understand from the name of the lesson? You sing songs also What do you understand from this?

S: The light should show the way, the proper way

T: So what big thing do you understand from this? God shows the way. We must be an example for others so other can follow. You are able to do so much So when the light goes off you go and search for a candle. It takes away the darkness You may think I am good for nothing you should not think like that but . With the help of you, God may do a great thing. You are important in the sight of God. Now we will go to the lesson. Before that let us do some hard words "Fragrance" (writes the word on the board).

S: Sweet smell (choral answer).

T. Broke out?

During question-and-answer time, teachers ask the questions requiring verbatim answers found either in the textbook or in the teacher's explanation of textbook content-illustrating "how" students should know something If a student's answer to a question is incorrect teachers move on to another student who can provide the answer she or he is looking for Teachers rarely encourage any lateral interaction between students—students do not disagree with each other or present other versions of a peer's answer [13]

Questions in maths are focused on whether the students know the various steps needed to complete the given problem. The following lines portray the interaction between teacher and students in a regular maths class.

T· Krishnamurthi, stand up. Can you please tell me how to find out a formula for finding the volume of this (pointing to a wooden prism on his table.)
S· (Krishnamurthi stands up and looks at the teacher There is silence for 40 seconds.)
T A general formula for finding the volume of a prism? Then we will come to the other bodies here (pointing to the cylinder, square and rectangle.)
S: (Silence again for 40 seconds)
T. See you have to think, you must listen, you must see how its is being done. Anybody? (A student close to Krishnamurthi stands up.)
S: Curved surface area into height.
T. Curved surface area into height?
S· Area of cross section into height.
T That's right Area is coming there and height is coming here (pointing to the prism) Therefore, square centimetre becomes cubic centimetre

Questions in English and social studies are factual and appear not to assess students' figurative or analytical skills. For instance in an English class on Don Quixote, some of the questions include: "Where did Don Quixote live? How did he pass his time? Who was Sancho Panza? Who did they meet? What did Don Quixote think? Why did Don Quixote smile scornfully?"

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[13] Much research has been done on "wait time" in the U S. (Tobin 1987) Studies suggest the longer the "wait time" for a student to respond to a question, the more possibilities for higher cognitive processing. Within the Indian context, since questions required answers containing verbatim textbook content, the analysis of "wait time" for questions seemed unproductive

VARIATION AMONG THE THREE TYPES OF SCHOOL POPULATION

We begin by reporting the physical variation evident among Type I, Type II and Type III classrooms. Then we describe both quantitative and qualitative varation in pedagogical practices among the three types of clases.

Variation in the Physical Composition of the Classrooms

Despite the uniform presence of basic instructional tools across classrooms, we observed considerable varation in terms of several factors (Table 1). Type I classrooms are well painted and fairly spacious and each student possesses his or her own desk. Four of these classrooms (all in the girls' school) have commercially produced posters on the walls in addition to a tablecloth and a vase with flowers on the teacher's desk. Seven classrooms (35 per cent) in Type II and twelve classrooms (70 per cent) in Type III have paint peeling off their walls. In Type II over half of the classrooms are cramped and crowded with students sitting on the floor in four of the classes Seventy-five per cent of the Type III classrooms are cramped and crowded and seven classrooms have students sitting on the floor. In both Type II and III classrooms have students sitting on the floor In both Type II and III classrooms, students are sharing desks.

TABLE 1
Variation in the Physical Characteristics of the Classrooms (n = 50)

	Type I (n = 13)	*Type II* (n = 20)	*Type III* (n = 17)
Classrooms with students having their own desk	13	20	10
Classrooms with students sharing desks	0	15	15
Classrooms with students sitting on the floor	0	4	7
Classrooms which are cramped	0	13	13
Classrooms with painted walls	13	13	5
Classrooms with commercial posters	4	0	0

Another physical variation becomes evident when the classrooms are looked at qualitatively Though 25 per cent of Type III classrooms are not crowded or cramped they are still not the right size for the number of students in the class. These very large rooms appear to be constructed either so two classes can be conducted in the same room at the same time or so that 150 students can be accommodated in a classroom

Interesting variations are also observed in the appearance of the students, particularly, the girls. The girls in the Type I classes dress in Western style uniforms (jumper and shirt) with kneelength skirts and their hair either braided or cut short The girls in Type II and Type III classes are only allowed to wear sarees or salwars (Indian attire with lose pants and shirt) with their hair worn long in a braid fastened with ribbons. Among the boys the only noticeable difference is footwear. Boys in Type I classes wear shoes while those in Type II and Type III wear slippers.

Quantitative Variation in Pedagogical Patterns

We observe quantitative variation in two areas. the amount of time spent on different activities by the teacher and the number of students participating during question-and-answer sessions Table 2 indicates the average amount of time spent on the main activities in the three types of classes, the number in brackets indicates the number of teachers using that particular teaching technique

TABLE 2
Average Amount of Time Spent on Different Activities in the Class
(in percentages of total minutes observed)

	Type I	*Type II*	*Type*
Maths	(n = 4)	(n = 9)	(n =9)
Explanation of the problem	34% [4]	38% [9]	26% [9]
Copying problems	2% [1]	13% [2]	29% [6]
Question-answer-response	24% [4]	31% [2]	18% [3]
Directions for assignments	3% [4]		10% [3]
Individual seat work	14% [2]	17% [3]	16% [2]
Checking		7% [3]	10% [3]
English and Social Studies	(n = 9)	(n = 11)	(n = 8)
Explanation of content	50% [9]	70% [11]	41% [8]
Reading of text	9% [8]	16% [3]	9% [8]
Explanation of vocabulary	13% [5]	30% [1]	11% [4]
Question-answer-response	29% [6]	26% [8]	24% [6]
Directions for assignment	5% [1]	5% [3]	
Individual seat work	10% [1]	8% [5]	2% [2]
Student presentations	17% [2]		
Checking		7% [1]	40% [1]

The number in brackets indicate the number of teachers observed using that particular activity.

In addition, the cumulative time spent on different teaching activities is laid out in Figure 1 Since there are only four maths and nine English and social studies classes from Type I, the calculation of cumulative time is restricted to the first thirteen (four maths and nine English and social studies) in Type II and Type III class sessions

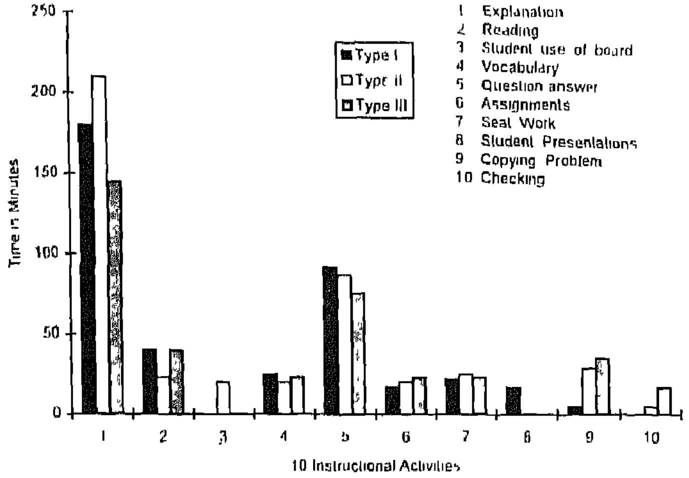

Figure 1 Cumulative time spent on 10 different activities by the three types of classes at the end of 13 sessions

Keeping in mind the crucial role of teacher in equipping students to pass exams at the end of the year, explanation of content is a crucial part of the Indian teaching scenario. While teachers from all three types of classes spent time explaining subject content, teachers differ both in the average and cumulative amounts of time spent on this activity. Type I teachers spent an average of 34 per cent and 50 per cent of class time in maths and English and social studies respectively, explaining content; Type II teachers, 38 per cent in maths and 70 per cent in English and social studies; and Type III teachers, 26 per cent in maths and 41 per cent in English and social studies Cumulatively, Type I teachers spent 3.2 hours explaining content, Type II teachers spent 3.3 hours; and Type III teachers spent 2.2 hours.

Variation is also evident in the amount of time spent copying maths problems of the board. Students in Type III maths classes spent an average of 29 per cent of class time copying problems off the board. In contrast only one of the Type I maths teachers spent 2 per cent of class time asking students to copy problems.

Similar to the explanation of content, although the question-and-answer sessions are structured and non-creative, they help to clarify the text in

English and social studies and in maths the steps required to solve problems In addition, they also provide model answers to questions that may appear on exams In maths classes, only two out of nine teachers in Type II and three out of nine in Type III allot time for question-and-answer sessions In contrast, the four maths teachers from Type I classes devote an average of 24 per cent of class time to questions-and-answers. Although not large, the cumulative amount of time spent on question-and-answer sessions also varied Type I teachers spent 1 3 hours, Type II 1 2 hours and Type III 1 7 hours.

In this respect, the variation in the number of questions asked to the whole class, as opposed to individual students, is critical, the former being less intelligible than the latter The seventeen Type III teachers address more questions to the whole class than did the thirteen teachers in Type I and the twenty in Type II. In fact, one out of five, one out of three and one out of two questions in Type I, Type II and Type III respectively are chorally responded to by the whole class (Figure 2).

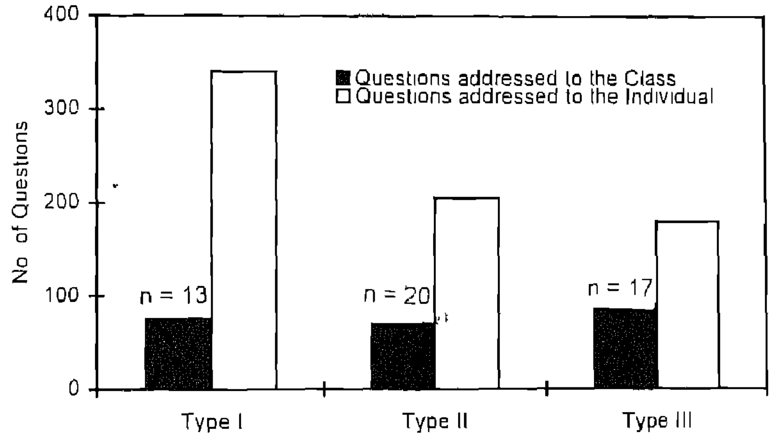

Figure 2 Number of Question to the class and to the individual student

Question-and-answer sessions also reveal variation in student participation in the three types of classrooms (Table 3) Over 80 per cent of the students in the Type III sample and 75 per cent in Type II did not participate in any interaction with the teacher Moreover, about one-third of the students who are asked question in Type III classrooms also respond to more than one question, indicating the teacher's consistent interaction with only a small percentage of the students in the class In contrast, almost half the students in Type I classes interact with the teacher, responding to at least one question

TABLE 3
Student Participation in the Three Types of Classrooms

	Type I	*Type II*	*Type III*
Total number of students videotaped	602	973	920
No. of students who were asked to respond to least one question	44%	23%	13%
No. of students who were asked to respond to at least two questions	8%	5%	1%
No. of questions requiring reading/recitation	4%	1%	2%
No. of questions requiring use of board	0.5%	3%	0 8%

Variation in Qualitative Snapshots of the Classrooms

Qualitative variation in pedagogy is discernable when teachers explain the textbook and when they interact with students both verbally and non-verbally. In order to provide a clear picture of the differences, we limit the discussion of qualitative variation to Type I and Type III class Type II classes share aspects of both Type I and Type III classes described below.

Type I and Type III classes differ in the way teachers introduce the subject and in their use of various pedagogical methods during the explanation of textbook content In maths, Type I teachers begin with a rather succinct introduction to the topic, as in the following description of one class. The topic for this class is about calculating the area. The teacher takes a piece of paper, folds it in the shape of a cylinder and points to all the areas that are exposed, the dimensions of which need to be worked out. He continues the lesson by writing the relevant formula on the board, explaining it with the paper model. After this short but clear introduction the teacher begins to work out problems, related to these topics. Moreover, while he works out problems on the board, the Type I teacher also provides a fairly detailed explanation of the various steps involved. Subsequently, he requests students to do a few problems on their own, in class In Type III maths classes two main activities are evident in the explanation of content; teachers working out sums on the board and students copying the sums. Both teachers enter the class, ask students to turn to a specific page and problem in the textbook, write the relevant formula on the board and work out the problem on the board Students then copy the problem.

Similarly in English, Type I teachers begin with instruction in grammar (the "if clause") followed by an introduction to the lesson After these two activities teachers proceed with explaining the text To clarify difficult vocabulary, teachers ask students to make sentences with the words. The class concludes with the reading of the text. In contrast, Type III teachers went straight into explaining sentences and paragraphs in the text. The explanation of content is long and dreary and only cursory references are made to the meanings of words during the lecture

Consistent non-verbal interaction between teacher and students takes place during Type I classes In maths, for instance, while doing calculations on the board and explaining the steps involved, teachers constantly look back at their students, meeting their eyes and persuading their attentiveness Non-verbal interaction is also portrayed when teachers monitor student work during class. They monitor students by walking between the desks, looking at students' work over their shoulder and occasionally explaining a mistake to an individual student In contrast, in Type III maths classrooms, teachers go through the steps verbally as they work it out on the board without looking back at the students. With reference to monitoring student work in class, teachers rarely walked around the class, usually they stood in front of the class waiting for students to finish copying the problem, before going on to the next one. This routine continued for the whole class. Considerable indifference and boredom (but acceptance) is evident among the students [14]

On the one hand, the frequent verbal moral admonishing to be diligent and work hard by Type I teachers is absent in Type III classes For instance, during a Type I maths class the teacher forcefully tells his students the following words:

> Formulae are vehicles of mathematics. Take the wheels off and it won't move You must master them at your beck and call. Once you see the problem (and) you recognise the problem, analyse it (by finding) what is needed Then you apply the formula and substitute these things.

On the other hand, teachers' lack of respect for students optimised in the following exchange from a Type III English class is absent in Type I classes:

> T : Go and get the attendance book All of you take your books, page 15, one five Give me a pen. Hey, eh, give me a pen (no one gives him a pen for a minute). Give me a pen. (He takes attendance by calling each students name and the student responds by saying "present." While he takes attendance a student starts talking to a fellow student.) Hey, you are talking in the class, stupid. Hey, sit right (Takes a textbook from the student.) "What a misfortune" already we have

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[14] P Jackson (1968) in his research on classroom life in the U S suggests that detachment and indifference is a "generic adaptive strategy" employed by students to deal with the demands of the hidden curriculum and the demands of classroom life.

finished this poem. Which poem? "Promise?" So today we shall do this poem. "The First Primrose "
"The First Primrose
Awakes from long winter sleep
And sticks out its head through its long leaves to pick"
Have we finished this poem?

S : Yes Sir.

T : So which one should we do? Yes, Yes. Page 40. "The Wealth of the Sea." (He continues by explaining part of this poem for the rest of the session)

This Type III teacher addresses his students as "Hey" and not by name He is also not prepared for the class and questions his students on what lesson they are supposed to do that day. They do not tell him immediately that he is on the wrong poem. They wait for him to come to that conclusion himself. (Had he not done, so they would have likely suffered through a repetition of the previous week's lesson)

DISCUSSION AND IMPLICATIONS

Our study highlights both the commonalities and variation in classrooms and pedagogical practices among three types of school populations. In considering the cultural construction of common pedagogical patterns, we first trace the cultural situatedness of three features shared by all three types of classrooms The cultural situatedeness of these universal classroom practices illustrate the extent to which local environments compel specificity We then deal with the cultural significance of the variation in pedagogical practices between private, semi-private and public schools. Again, SES interacting possibly with caste, systematically ordering variation, illustrates how classrooms can be embedded within the broader cultural context

We consider three common pedagogical routines followed by teachers in Madras· lecturing, using the textbook, and questioning. First, though the lecture or didactic method of instruction is used by teachers in most countries, its purpose and form within the classroom in Tamilnadu is is contextually organised. For these teachers, their lengthy explanations of content is intended to help students understand the text in order to be able to memorise it with ease. Further, the form in which this instructional method takes place–teachers explaining text and students' compliant attitude towards knowledge communicated by the teacher—appear to be characteristic of inter-generational posturing in the society. Adults instruct their children similar to how teachers lecture students in class.

Second, while the textbook is very much part of the classroom scenario in both developed and developing countries, teachers and students in the south Indian classroom appear to have a unique relationship to the textbook On the one hand, societal respect for the written word supports the function of the textbook as bearer of everything that needs to be learnt

Consequently, teachers uncritically accept knowledge contained in the textbook and students model their learning accordingly. On the other hand, both the role of the textbook and exams at the end of the year (which tests students only on textbook based facts) account for the ambivalent attitude towards personal knowledge among both teacher and student Student learning, focused around the textbook, is considered to be separate and more important than the students' personal context and experience.

Third, teacher-student interaction during the question-and-answer sessions is another universal feature of classrooms with contextual implications The intent and style of verbal interaction during question-and-answer sessions follow the purposes and forms of interaction in the broader context. In the West, question-and-answer sessions are usually intended to monitor a students' conceptual understanding of subject content In addition, student interactions in the class also serves to provide examples of how a topic could be approached in different ways by different students In contrast, the function of question-and-answer sessions within the south Indian context is to make sure that students know what the adults know (the text), rather than to monitor student learning in terms of the construction of their own knowledge. The interactional form of teachers asking the questions and students replying and the absence of any kind of interaction involving a play with "knowledge" also coincides with Indian patterns of child rearing and socialisation (Kakar 1978) Indian children are socialised into perceiving adult knowledge as almost flawless and complete and consequently, children rarely question or disagree with adults.

Similar to studies in the West that illustrate the influence of social class on the organisation of pedagogy and classrooms, our study also reveals the influence of SES on teaching and learning in a specific non-western setting, namely Madras, India Further, since caste in India is associated with class, this study also illustrates the influence of local forms of societal stratification Both quantitative and qualitative variation in pedagogical practices across private, semi-private and state-funded schools suggest the subtle impact of SES and caste on classrooms in Madras.

Quantitative variations, especially with reference to time spent explaining textbook content, questioning, and copying are significant and tent to be ordered according to the three types of school populations Type I maths teachers spent more (34 per cent) explaining content than Type III teachers (26 per cent) The latter teachers' students spent more time in the passive activity of copying of the board (29 per cent) than Type I teachers (2 per cent) Fifty per cent of the students in Type I classes are asked questions by the teacher, less than 25 per cent of the students from Type II and Type III say anything in class. Qualitative variation reiterates quantitative variation among the three types of schools—Type III teachers' explanations of textbook content are less comprehensive than Type I teachers' explanations, both during verbal and non-verbal interaction Type III teachers are less involved with their students than Type I teachers

Both quantitative and qualitative variations portray restrictions in learning placed upon Type III students. The distancing of Type III and (less so for) Type II students from school learning is either consciously or unconsciously accepted by the teacher. Learning for the Type I student, in contrast is much more adequate Teachers are intimately involved in their comprehension of textbook knowledge and their successful performance in the exam

Policy Implications and Future Research

The above discussion of the cultural situatedness of both the commonalities and variation in pedagogy within the south Indian context illustrates the cultural specificity of classroom practices. It communicates the importance of taking into consideration local forms of social participation, attitudes towards knowledge and instructional materials when conceptualising and implementing policy dealing with teachers in any country.

The implications of this study with reference to educational policy in India is particularly significant Central educational agencies in India are immersed in their attempts to "revitalise and modernise" teaching and learning in India (National Policy on Education, 1986, Taylor 1991). However, as Dyer points out (1994), these efforts continue to be "top-down." "Very little attention is paid to how teachers, steeped for years in a textbook culture and with little experience of the use or applications of teaching aids, would be trained. . ." (p. 240). Our study reiterates and clarifies the continuity of teaching practices in the classroom with the surrounding cultural environment, thereby, depicting the tenacity and deep-rootedness of these restrictive classroom practices in India. And unless the "top-down" implementation of policy takes into consideration teachers' culturally defined explicit and implicit relationships to pedagogy, reform in teaching and learning is unlikely.

While this study begins to address the question of how local meanings and forms of stratification construct teaching and learning within a specific developing country context, further studies which include qualitative interviews with teachers could provide more in-depth and distinctive information related to this area. The unique influence of caste could also be more apparent in studies done in rural schools where the influence of caste is stronger than in cities. In this respect, studies focusing on the impact of non-material forms of status and power associated with caste in India, and its impact on classrooms practices could also be informative [15]

In this study we have attempted to provide a detailed and descriptive picture of life in classrooms in Madras, India. Rather than perceiving practices within classrooms as universal and neutral phenomena, this study illustrates the cultural embeddedness of both the uniform character of classroom life as well as the variation among different school populations. Further, this study exposing pedagogical variation across private, semi-private and public classrooms points to specific school population who require attention within the Indian context. It is hoped that this study communicates the importance of taking seriously the cultural dimensions of classroom activity in order to assess how teaching and learning can be enhanced in developing countries

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[15] Using the caste system in India, M Milner (1994) puts forward a non-material theory of status, primarily "located" in other people's minds It is possible that teaching and learning in India is influenced by such forms of status and power associated with caste

Classroom Transaction: Evidences for Strategic Planning

M.A. Khader

Lately the concern has been expressed regarding low school quality, particularly at the primary level The prevailing school quality, measured in terms of achievement, is exceedingly low Classroom transaction in multigrade context continues to be a major concern The study has addressed the issues related to the level of classroom transaction and major variables that differentiate the multigrade and non-multigrade schools. The pattern of differences in classroom transaction is also explored.

The study was carried out on a sample drawn from the DPEP district Hissar in Haryana. The sample consisted of 10 multigrade and 10 non-multigrade primary schools, drawn from rural and urban areas Data were collected on twenty variables related to classroom transactions and classroom observations. The obtained data were processed using analysis of variance. The data were further subjected to multivariate analysis at different levels The data on 20 schools, over 4 groups and 20 variables were subjected to MANOVA and canonical discrimination analysis

The emerging evidences have pinpointed that the prevailing level of classroom transaction in multigrade and non-multigrade schools was below average Considering the mean values of the variables contributing to the three functions, all the groups including rural multigrade, urban multigrade, rural non-multigrade and urban non-multigrade were all below average level Both multigrade groups were weak in providing instruction for learner involvement Despite similar level of classroom management, rural non-multigrade group made effort to provide instruction for learner involvement. Urban non-multigrade schools were extremely weak in providing instruction for learner involvement.

It is emphasised that the identification of the context of school is essential for strategic planning. Urban non-multigrade groups require training inputs to strengthen the existing levels of classroom management and planning instructional activities in urban non-multigrade as well as the classrooom Management, planning instructional activities and instruction for learner involvement in rural non-multigrade group are the major training needs Training inputs on planning instructional activities is a major need for urban multigrade, along with classroom management and planning instructional activities for both types of multigrade schools

Introduction

Low school quality, particularly at the primary level, continues to be one of the major concerns in India The thrust placed on achievement along with access, enrolment and retention by the National Policy on Education, 1986 and the updated version in 1992 does demonstrate the magnitude of this concern The prevailing school quality, measured in terms of achievement, is exceedingly low. The baseline study, for instance, undertaken as part of the DPEP strategy to assess the learners' achievement in language and mathematics presents a dismal picture (for details see NCERT 1994) Learners attaining mastery level in word meaning and reading comprehension are too less in most of the districts and the size does not exceed 10 per cent. The picture is no way different in mathematics indicating exceedingly low level of performance in addition and subtraction. A related study undertaken in West Bengal points out that the percentage of learners attaining minimum expected score is certainly less whether it is language or mathematics (Guha Roy, Mitra and Roy 1995) These evidences substantiate the contention that the primary school classrooms are crowded by non-achievers. If we allow this trend, the gap between a few who achieve and the majority who do not get widened and sharpened leading to what is often called Mathew effect. Obviously this trend needs to be arrested by discerning manipulable school conditions that are important for learner achievement

In fact, central to any effort to improve the quality of education is teaching-learning process in a classroom setting (Scheerens 1992) The premise is that the classroom transaction reflecting the nature and level of involvement of teacher and learner sets the context for learning and achievement The process for involvement is set in motion by teacher However, the problem gets compounded when the teachers' knowledge level of subject matter is inadequate (Shukla 1995).

Early researches on student achievement formulated around input-output model have been contradictory and suggest weak organisational effects (Murnane 1981, Rutter 1983). The model has been criticised for its limited success due to emphasis on variables that are easy to define and measure (Willms 1992) and its failure to suggest how to improve school practice (Levin 1980) In the recent past there has been a shift towards school processes (Purkey and Smith 1983; Good and Brophy 1986) and the shift has tilted the researchers attention towards process components. What is important from policy perspective is the identification of process components that can be influenced through school policy, and practice. Infact, classroom transaction is a major process component that has important consequences for policy formation.

There is a linkage between school and classroom factors For instance, most of the factors that have been identified as the indicators of effective school (Scheerens 1992; Reynolds 1993) are infact reflections of the indicators of classroom process (Creemers 1995). Evidences point out the importance of curriculum, grouping procedures and teacher behaviour (Creemers 1995); questioning, eliciting and feedback mechanisms within the task, time and talk framework (Alexander 1995), periodic learner assessment and feedback (Satvir Singh et al. 1995), and possessing essential knowledge and skills, and performing such skills by the teachers (Chapman 1993) in explaining the classroom level. Recognising the need for scaling down teachers' resistance for change and innovation, and encouraging them to support new classroom practices, Chapman (1995) suggests a set of strategies such as revising innovations, creating incentives and persuading teachers for their participation and involvement

Classroom transaction in multigrade context continues to be a major concern Though observation reveals that teachers invariably rely upon conventional pedagogy and students seldom involve in learning process (Sujatha 1995), appropriate intervention strategies in multigrade teaching situations make significant shift in the pattern of achievement (Nagaraju 1995). What is emerging is the need for formulating appropriate classroom transaction strategies specific to multigrade context (Mohan Lal 1997; Khichi 1986, Muralidharan et al. 1993), Weather it is multigrade or non-multigrade context, what goes on in the classroom mirror the quality of teaching and learning.

Recognising the centrality of classroom transaction in judging the quality of school, this paper tried to discern the pattern of classroom transaction multigrade and non-multigrade schools. The evidences are based on data system gathered from schools under the District Primary Education Project Considering the thrust placed on improved teaching and learning competence in the DPEP, creation of a baseline data system on classroom transaction would facilitate in choosing the relevant academic inputs to the project.

The paper addresses the following questions:

- What is the level of classroom transaction in multigrade and non-multigrade schools?
- Which are the major variables that differentiate the two groups of schools?
- What is the pattern of differences in the classroom transactions between multigrade and non-multigrade schools?

METHODOLOGY

Sample

The study is operationalised based on a sample drawn from the DPEP district, Hissar, Haryana. Unit of observation is school and using stratified random sampling ten multigrade and ten non-multigrade primary schools were drawn for intensive observation of classroom transaction. Each category has schools drawn from rural and urban areas Thus, the sample consisting of twenty schools is grouped into four—rural multigrade, urban multigrade, rural non-multigrade and urban non-multigrade

Classroom Transaction

The classroom transaction is conceived and identified in terms of the following variables:

- *Instructional planning* refers to advance planning done by the teacher in terms of clarity of objectives and organisation of lesson Clarity of objective consists of three variables—clarity of objectives—unit (COU), clarity of objective—lesson (COL) and clarity of objective—total (COT) where the first two are quantified on a five point scale ranging from less clear to highly clear and the average of the two indicates the score of COT Likewise organisation of lesson consists of organisation of lesson—ordering content (OLOC), organisation of lesson—selection of activities (OLSEA) and organisation of lesson—total (OLET) The data of OLOC and OLSEA are obtained on a five point scale ranging from less appropriate to highly appropriate and the average of the two indicates OLET Thus, instructional planning consists of six variables.
- *Instructional strategy* refers to the strategies used by the teacher in the classroom including their effectiveness. It consists of five variables identified as instructional strategy—direct presentation (INSDIP), instructional strategy—learner centred approach (INSLECEA), instructional strategy—effectiveness (INSEFF) and instructional strategy—total (INSTO). The data on the first four are obtained on a five point scale ranging from low to high and the average of the four indicates the score of INSTO
- *Learner involvement (LTN)* denotes the extent of involvement of learners in the learning process during the classroom transaction. The data is obtained on a single item on a five point scale ranging from less involved to highly involved

- *Time on task* indicates the extent of time devoted by the teacher as well as by the students on task. It consists of two variables, time on task—teacher (TOTT) and Time on task—student (TOTS), and each is quantified on a five point scale ranging from minimum to maximum.
- *Attention to individual learning (ATIL)* means efforts of the teacher to promote learning and attainment of the identified competencies by each learner. It is identified in terms of grouping of students, remedial instruction, teaching to suit the level of learners and different levels of activities. Data are obtained on a five point scale ranging from never to always for four items and the average score indicates ATIL.
- *Classroom management (CROMA)* refers to instructional management of classroom in multigrade situations and is identified in terms of peer tutoring, learning teams and group work. Each is identified on a five point scale ranging from never to always and the average score indicates CROMA
- *Effectiveness of classroom management (EFFCROMA)* denotes the effectiveness of instructional management of activities, time and involvement of learners. Data is obtained based on a single item ranging from less effective to highly effective.
- *Evaluation and feedback (EVAFE)* refers to the pattern of evaluation practised and the extent to which evaluation data is used for identification of learner deficiencies and remedial instruction. The two items on learner deficiency and remedial instruction are quantified on a five point scale ranging from never to always and the average score indicates EVAFE.
- *Innovative practice (INPRA)* refers to the teacher's effort to use novel methods, experimenting new instructional strategy and searching for new idea. Each component is quantified using a five point scale ranging from never to always and average score indicates INPRA
- *Resistance to innovative practice (REINPRA)* indicates teacher's resistance to practising innovative ideas and strategies, and is identified on a single item using a five point scale ranging from low to high

Observation

An observation schedule to gather the field data on the twenty variables specified above was developed. Prior to field observation, using the schedule two observers observed the classroom transactions at the primary level classes in the Demonstration School, RIE, Ajmer for seven days This exercise was done to try out the observation schedule as well as to orient the observers on the observation of classroom transactions Based on try out data the observation schedule was revised Field observation of multigrade and non-multigrade schools drawn from Hissar was completed in two phases with a gap of ten days in March-April, 1996. Each school was observed for a day by each observer. Among the two observers, while one observed multigrade schools, the other observed non-multigrade schools during the first phase. They exchanged the type of school during the second phase enabling each observer all the multigrade (10) and non-multigrade (10) schools.

Each observer made two observations of classroom transactions per school and each school has four observations, except one school where the total observation is three. Observers also held discussions with teachers wherever precise and more detailed data were required

Data Analysis

The obtained data were analysed to determine the inter-rater reliability. Using two-way analysis of variance the analysis was done Results indicate no significant difference between observers on most of the variables except on four variables: clarity of objective—unit, organisation of lesson—ordering of content, time on task—teacher, and time on task—student.

The data were further subjected to multivariate analysis at different levels as outlined below for answering the research questions. The data on twenty schools over four groups and twenty variables are subjected to MANOVA. The analysis gives univeriate F-ratios for each variable over groups, group means for variables and correlations between variables The data, as given under MANOVA are further subjected to canonical discriminant analysis giving results in terms of given values (variances for extracted discriminant factors) factor pattern and group centroids in the CDA space Using the above analysis schools and groups are well differentiated

Results and Discussion

Manova

Group and total means are given in Table 1 Mean score of the groups are compared on the basis of total means

On clarity of objective—unit, total mean is 1 85 and both rural and urban non-multigrade groups have higher mean score than the total mean On the other hand both rural and urban multigrade groups have mean values lower than total mean The highest mean score for clarity of objective—lesson is for rural non-multigrade. Except rural multigrade, the remaining three groups have higher mean value than the total mean (2.25) The total mean for clarity of objective—total is 1.95. Except rural multigrade, the remaining three groups have mean scores either same or above the total mean. It is important to note that in all the three variables rural multigrade group has the least mean values below the total means.

With regard to organisation of lesson—ordering of content, urban multigrade and rural non-multigrade have higher mean values than the total mean (1.89). Total mean of organisation of lesson—selection of activities is 1.59. Except urban multigrade, the remaining three groups show higher mean values than the total mean. Rural non-multigrade shows the highest mean value. With regard to organisation of lesson—total, both multigrade groups have mean values below the total mean (1.85) On the other hand, both non-multigrade groups have values above the total mean

TABLE 1
Group and Total Means

Variable *Group*	1	2	3	4	5	6	7	8	9	10
A	1.53	1.89	1.74	1.58	1.74	1.68	3.68	1.89	1.47	1.89
B	1.80	2.30	1.95	1.90	1.05	1.80	3.85	1.70	1.40	1.80
C	2.25	2.67	2.25	2.42	2.08	2.17	3.58	2.33	2.00	2.75
D	1.93	2.29	1.96	1.86	1.68	1.86	3.61	2.04	1.50	1.86
Total	1.85	2.25	1.95	1.89	1.59	1.85	3.68	1.96	1.54	1.99

Variable *Group*	11	12	13	14	15	16	17	18	19	20
A	2.10	2.21	3.53	2.16	0.58	0.68	2.05	0.53	0.58	2.21
B	2.05	2.20	3.65	2.25	0.25	0.60	2.15	0.35	0.10	1.90
C	2.58	2.92	3.25	2.50	1.08	0.00	3.00	0.50	0.92	1.42
D	2.14	2.14	3.50	2.14	0.29	0.00	2.79	0.68	0.25	1.79
Total	2.18	2.29	3.51	2.23	0.47	0.32	2.48	0.53	0.39	1.86

See Table 1A for list of variables

TABLE 1A
List of Variables

Variables

1. Clarity of objective – Unit (COU)
2. Clarity of objective – Lesson (COL)
3. Clarity of objective – Total (COT)
4. Organisation of lesson – Ordering of content (OLOC)
5. Organisation of lesson – Selection of activities (OLSEA)
6. Organisation of lesson – Total (OLET)
7. Instructional strategy – Direct presentation (INSDIP)
8. Instructional strategy – Learner centred approach (INSLECEA)
9. Instructional strategy – Materials used (INSMA)
10. Instructional strategy – Effectiveness (INSEFF)
11. Instructional strategy – Total (INSTO)
12. Learner involvement (LIN)
13. Time on task – Teacher (TOTT)
14. Time on task – Student (TOTS)
15. Attention to individual learning (ATIL)
16. Classroom management (CROMA)
17. Effectiveness of classroom management (EFFCROMA)
18. Evaluation and feedback (EVAFE)
19. Innovative practices (INPRA)
20. Resistance to innovative practice (REINPRA)

Group

A = Rural Multigrade
B = Urban Multigrade
C = Rural Non-multigrade
D = Urban Non-multigrade

Group means of the instructional strategy—direct presentation for both rural and urban multigrade groups are either same or above the total mean However, the means of rural and urban non-multigrade groups are below the total mean (3.68). It is important to note that among the twenty variables direct presentation has the highest total mean value. Value of the total mean of instructional strategy—learner centred approach is 1 96. While both rural and urban multigrade groups have values below the total mean, rural and urban non-multigrade groups have values above the total mean In the case of instructional strategy—material used the total mean is 1.54. Among the four groups, only the rural non-multigrade has value above the total mean and the urban multigrade has the lowest value With regard to instructional strategy—effectiveness the total mean is 1 99 Among the four groups only the rural non-multigrade has the mean value above the total mean. Likewise, on instructional strategy—total only the rural non-multigrade has the mean value above the total mean.

What is strikingly visible among the instructional strategy variables is the observation that direct presentation has the highest mean values in both groups and total It means that whether it is multigrade or non-multigrade groups all follow conventional textbook approach during instruction.

Value of total mean on learner involement is 2.29 While rural non-multigrade has higher mean value than the total mean, the remaining three groups have values below the total mean. However, the mean values of all the four groups are below average on the five point scale. This reflects the existing level of learner involvement.

The total mean for time on task—teacher is 3.51 The value is, certainly, tilted towards above average on the five point scale Among the four groups both multigrade groups show mean value above the total mean Whereas both non-multigrade groups are below the total mean. Well, the difference between both sets of groups is marginal. The mean scores reflect that the teacher's share of time on task is more. It is natural that the students will be having less time on task Total mean for time on task—student is 2.23 and it is well below the value of teachers time on task While urban non-multigrade group has the lowest mean value (2 14), rural non-multigrade has the highest mean value (2.50) It is highly visible that the teacher's share of time on task as compared to students is substantially high

The highest mean score for attention to individual learning is for rural non-multigrade and the value of rest of the groups are much less. The total mean is 0 47 and it explains the prevailing low level of effort to provide for individual attention for learning

In the case of classroom management the total mean is 0.32 and the value explains the prevailing low level of instructional management specific to multigrade setting whether it is rural or urban. The total mean for effectiveness of classroom management is 2 48 While both non-multigrade groups have higher values than the total mean, multigrade groups have values below the mean Rural non-multigrade group has the highest value.

On evaluation and feedback the total mean is 0 53 and all the group means are below 0 70 Extremely low mean values mirror the prevailing evaluation and feedback mechanisms in multigrade and non-multigrade groups These schools seldom use evaluation data either for identification of learner deficiency or for remedial instruction.

Likewise the total mean for innovative practice is extremely low (0.39) Teachers of multigrade and non-multigrade groups seldom involve in using novel methods or experimenting new instructional strategy or searching for new ideas. It does not mean that teachers are highly resistant to innovative practice. The total mean for resistance to innovative practice is 1 86 The highest mean is for rural multigrade group (2.21). The group and total means are at below average level Though there is certain degree of reistance to innovative practice in multigrade and non-multigrade groups, this can be possibly, overcome by adopting suitable strategies

These evidences are used to answer the question· What is the level of classroom transactions in multigrade and non-multigrade schools? The emerging evidences indicate that except on instructional strategy—direct presentation and time on task—teacher, the multigrade and non-multigrade groups maintain below average or low levels on all other variables which have implications for active classroom transactions What is striking is that selection of objectives and organising the lessons in advance for instruction by the teachers are not that common. Classroom transactions based on learner centred approaches and instructional support materials are rare features in these schools It is quite revealing to observe that available instructional support materials are seldom used Further probe indicates lack of skills in the use of such materials and highlights the need for training in this area. Well, the effectiveness of instructional strategies employed is low Direct presentation based on textbooks and more time on task by the teacher imply the dependence on conventional instructional approach to classroom transactions In the context of less active instructional strategies and more dependence on conventional strategy, it is natural for the students to involve less in classroom transactions. Likewise, the effort to promote individual learning and use of evaluation data for locating student deficiency and remedial instruction are too less Certainly, classroom transaction are rarely visible in these schools, whether multigrade or non-multigrade

Among group correlations are shown in Table 2 Important variables with high significant correlations are only discussed

Group correlations suggest that clarity of objective—unit has high correlations with clarity of objective—lesson (0 97), clarity of objective—total (98), organisation of lesson—total (.96), instructional strategy—learner centred approach (.71), instructional strategy—materials used (.75), instructional strategy—effectiveness (0 70), instructional strategy—total (77) and effectiveness of classroom management (89) However, it has negative high correlations with classroom management (– 82) and resistance to innovative practice (–.99). Clarity of objective lesson has higher correlations with clarity of objective—total (.99), organisation of lesson—ordering of content (.97), organisation of lesson—total (93), instructional strategy—total (.71), time on task—student (76) and effectiveness of classroom management (.75) However, it has high negative correlation with resistance to innovative practice (–.98) Organisation of lesson—ordering of content shows high correlations with organisation of lesson—total (.97), instructional strategy—materials used (.83), instructional strategy-effectiveness (83), instructional strategy—total (.84), learner involvement (84), time on task—student (.89) and effectiveness of classroom management (.71) However, it

TABLE 2

Among Group Correlation

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1.00	0.97	0.98	0.94	0.35	0.96	−0.44	0.71	0.75	0.70	0.77	0.68	−0.68	0.69	0.40	−0.82	0.89	0.17	0.27	−0.99
2		1.00	0.99	0.97	0.16	0.93	−0.21	0.55	0.69	0.67	0.71	0.68	−0.54	0.76	0.35	−0.67	0.75	−0.06	0.17	−0.98
3.			1.00	0.99	0.28	0.97	−0.31	0.65	0.78	0.76	0.80	0.76	−0.65	0.81	0.47	−0.69	0.79	−0.02	0.31	−0.99
4				1.00	0.29	0.97	−0.26	0.64	0.83	0.83	0.84	0.84	−0.68	0.89	0.57	−0.59	0.71	−0.13	0.40	−0.59
5					1.00	0.48	−0.92	0.91	0.74	0.67	0.73	0.56	−0.10	0.29	0.74	−0.54	0.60	0.61	0.84	−0.33
6.						1.00	−0.46	0.79	0.90	0.87	0.91	0.85	−0.81	0.83	0.63	−0.71	0.82	0.07	0.50	−0.97
7							1.00	−0.89	−0.58	−0.48	−0.59	−0.34	0.79	−0.07	−0.45	0.77	−0.77	−0.85	−0.57	−0.41
8.								1.00	0.88	0.81	0.89	0.72	−0.97	0.51	0.72	−0.78	0.85	0.55	0.74	−0.70
9.									1.00	0.99	0.99	0.96	−0.95	0.85	0.90	−0.53	0.67	0.09	0.83	−0.75
10										1.00	0.99	0.99	−0.91	0.90	0.93	−0.42	0.58	−0.04	0.84	−0.71
11											1.00	0.96	−0.95	0.85	0.89	−0.55	0.69	0.10	0.82	−0.77
12												1.00	−0.84	0.95	0.92	−0.32	0.48	−0.19	0.81	−0.69
13.													1.00	−0.65	−0.86	0.63	−0.74	−0.36	−0.86	0.67
14														1.00	0.78	−0.21	0.38	−0.43	0.61	−0.71
15															1.00	−0.16	0.32	−0.07	0.97	0.41
16																1.00	−0.98	−0.70	−0.15	0.79
17.																	1.00	0.60	0.29	−0.87
18																		1.00	0.09	−0.13
19																			1.00	−0.27
20.																				1.00

Value of significance of rate 0.01 level of confidence is 0.287, DF = 78 has negative high correlations with resistance to innovative practice (–.59) Likewise organisation of lesson—selection of activities indicates high correlations with instructional strategy—learner centred approach (.91), instructional strategy mateirals used (.74), instructional strategy—total (.73), attention to individual learning (.74) and innovative practice (.84). Its negative high correlation with instructional strategy—direct presentation (–.92) is clearly visible

It is striking to see that instructional strategy—direct presentation has negative high correlation with instructional strategy—learner centred approach (–.89), effectiveness of classroom management (–.77) and evaluation and feedback (–.85) while it shows positive high correlations with time on task—teacher (.79) and classroom management (.77) Instructional strategy—learner centred approach shows positive high correlations with instructional strategy—materials used (.88), instructional strategy—effectiveness (.81), instructional strategy—total (.89), learner involvement (.72), attention to individual learning (.72), effectiveness of classroom management (.85) and innovative practices (.74). On the other hand, it shows high negative correlations with time on task—teacher (–.97), classroom management (–.78) and resistance to innovative practice (–.70). Instructional strategy—materials used shows high correlations with instructional strategy—effectiveness (.99), instructional strategy—total (.99), learner involvement (.96), time on task—student (.85), attention to individual learning (.90) and innovative practices (.83) It shows negative high correlations with time on task—teacher (–.95) and resistance to innovative practice (–.75).

Instructional strategy—effectiveness too shows high correlations with instructional strategy—total (.99), learner involvement (.99), time on task—student (.90), attention to individual learning (.93) and innovative practices (.84) However, it has negative high correlations with time on task—teacher (–.91) and resistance to innovative practice (–.71). Learner involvement has high correlations with time on task—student (.95), attention to individual learning (.92) and innovative practices (.81). But it shows negative high correlation with time on task—teacher (–.84). Time on task—teacher shows negatiave high correlation with attention to individual learning (–.86), effectiveness of classroom management (–.74) and innovative practices (–.86). On the other hand, time on task—student shows high correlation with attention to individual learning (.78) and negative high correlation with resistance to innovative practice (–.71). Attention to individual learning shows high correlation with innovative practices (.97).

F-ratios in Table 3 point out that three variables have significant ($P < 0.05$) variation over four groups. The highest differences among the groups are seen in classroom management followed by effectiveness classroom management and organisation of lesson—selection of activities. As compared to these variables the remaining variables are less powerful in discriminating the groups Values of F-ratios of these variables are in decreasing order, higher the value of F, more the power to discriminate the groups.

TABLE 3
Univariate F-ratios and Coefficient of Variation % Over Groups

Variables	*F*	*CV%*
1. COU	4.30	63.5
2 COL	3.76	54.8
3 COT	2.73	41.3
4 OLOC	4.85	69.8
5 OLSEA	9.91*	110.9
6 OLET	2.41	41.6
7 INSDIP	0.94	14.3
8. INSLECEA	2.76	53.2
9. INSMA	2.21	65.4
10 INSEFF	5.67	83.8
11. INSTO	6.70	41.4
12 LIN	5.67	59.6
13. TOTT	1.06	18.1
14 TOTS	0.81	28.3
15 ATIL	7.92	318.1
16. CROMA	22.97*	521.9
17 EFFCROMA	11.88*	78.9
18 EVAFE	1.57	122.7
19 INPRA	7.57	367.5
20 REINPRA	2.16	68.5

1 = with 3 and 75 degrees of freedom
2 = *Significant ($P < 0.05$)

Canonical Discriminant Analysis

Results of Eigen values and related statistics in Table 4 reveal that three discriminant functions have the ability to discriminate the four groups 100 per cent Eigen values and their associated canonical correlations indicate the realtive ability of each function to differentiate the groups. Eigen values for the three functions are 3.03, 1.34 and 0.83 respectively The first three functions together explain 100 per cent variance among groups. The first function explains maximum variation to the extent of 58.29 per cent while the second function accounts for 25.82 per cent and the third function accounts for 15.89 per cent of the variation

TABLE 4
Eigen Values and Related Statistics

Roots Removed	*Canonical Correlation*	*R-Square*	*Eigen Value*	*Chi-Square*	*NDF*	*Lambda*	*Trace, %*	*Cumulative %*
0	0.87	0.75	3.03	148.17	60	0.11	58.29	58.29
1	0.76	0.57	1.34	56.18	38	0.43	25.82	84.11
2	0.67	0.45	0.83	0.00	18	1.00	15.89	100.00

Results in Table 5 show the emerging factor pattern for discriminant functions. Factors/functions are characterised by the variables which are highly correlated with them. These are indicated by plotting the factor pattern scores and showing them as vectors (See Figures 1, 2 and 3).

TABLE 5
Factor Pattern for Canonical Discrimination Functions

Variables	*Factors*		
	I	*II*	*III*
1. COU	0.39	–0.07	–0.25
2 COL	0.32	–0.16	–0.28
3. COT	0.28	–0.09	–0.27
4. OLOC	0.32	–0.10	–0.42
5. OLSEA	0.24	0.61	–0.22
6 OLET	0.26	–0.00	–0.28
7. INSDIP	–0.14	–0.19	–0.01
8 INSLECEA	0.26	0.25	–0.18
9 INSMA	0.17	0.13	–0.33
10 INSEFF	0.21	0.17	–0.55
11. INSTO	0.29	0.21	–0.52
12. LIN	0.17	0.11	–0.59
13 TOTT	–0.13	–0.16	0.17
14 TOTS	0.06	–0.02	–0.25
15 ATIL	0.07	0.34	–0.61
16 CROMA	–0.78	–0.17	–0.06
17. EFFCROMA	0.64	0.15	–0.10
18. EVAFE	0.16	0.20	0.20
19. INPRA	0.04	0.45	–0.50
20 REINPRA	–0.28	0.06	0.19

Table 5 and the related figures suggest that classroom management have highest contributions to the first factor The factor is loaded heavily on the negative side by classroom management and with effectiveness of classroom management on the positive side While classroom management implies instructional management of classroom in multigrade situations, effectiveness of classroom management denotes the effectiveness of instructional management of activities, time and involvement of learners in general. These two variables have high negative correlation (Table 2) Since both variables reflect the classroom management from two perspectives the first factor is termed as classroom management with the emphasis on multigrade situation on the negative side and general on the positive side

The data in Table 5 and and the related figures suggest that the second factor is loaded positively by organisation of lesson-selection of activities, attention to individual learning and innovative practices Organisation of lesson-selection of activities has the highest contribution to this factor followed by innovative practices and attention to individual learning. It is important to note that the contributions of latter two variables, as compared to the first variable, are much less in second factor and their contributions are more towards the third factor. Besides organisation of lesson—selection of activities has significant high correlations with attention to individual learning and innovative practices (Table 2). Organisation of lesson—selection of activities implies planning of instructional activities for classroom transaction in advance and it provides a meaningful interpretation of the second factor As such the second factor is called as planning instructional activities.

The third factor is negatively loaded by attention to individual learning, learner involvement, instructional strategy-effectiveness, instructional strategy—total and innovative practices These variables reflect the use of instructional strategies specific to learner needs and ensuring their involvement in classroom transaction and learning. As such the third factor is called instruction for learner involvement.

Further evidences about the groups—A (rural multigrade), B (urban multigrade), C (rural non-multigrade) and D (urban) non-mult-grade)—differences are derived from the group centroids reported in Table 6 These are the mean discriminant scores for each group locations in the space, defined by the discriminant functions I and II, and I and III, and II and III The differences can be visualised with ease after plotting them on graphs (Figures 1, 2 and 3).

It is important to note that the mean values of the variables contributing to the function I, II and III are, in general below average on a five point scale (Table 1) and it reflects the level of prevailing classroom transaction.

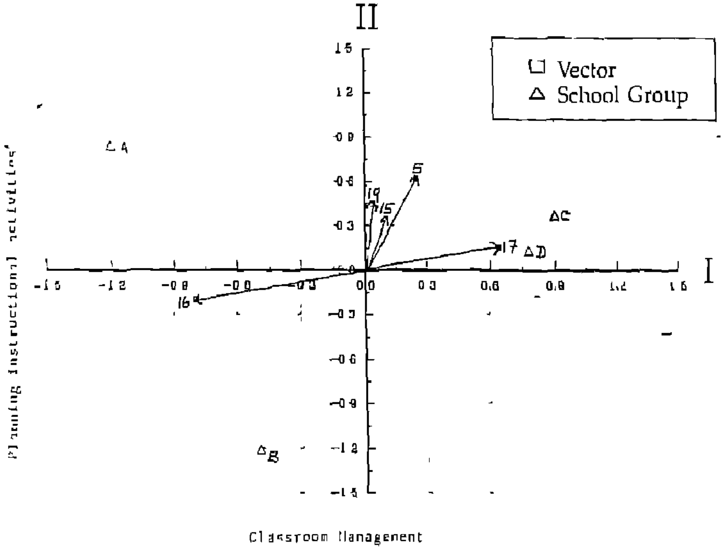

Figure 1 Projection of groups and the variable vectors on the plane defined by I and II discriminant functions

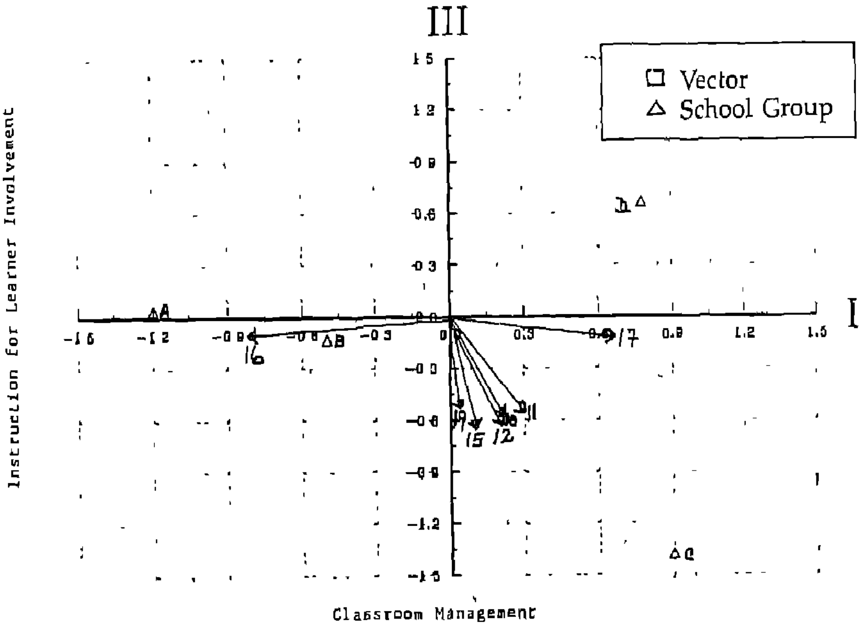

Figure 2 Projection of groups and the variable vectors on the plane defined by I and III discriminant functions.

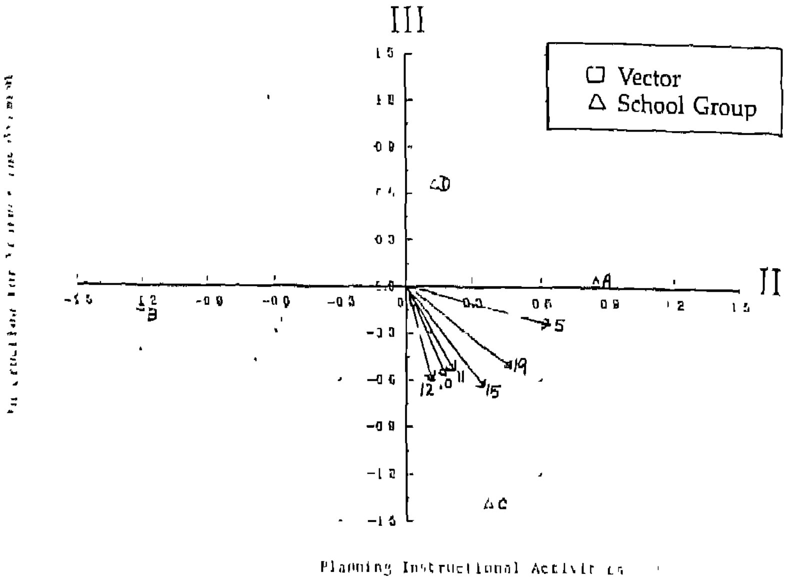

Figure 3. Projection of groups and the variable vectors on the plane defined by II and III discriminant functions.

Locations of groups on the planes of discriminant functions are discussed as high or low within the existing level.

TABLE 6
Group Centroids in Canonical Space

Factors Group	*I*	*II*	*III*
A	-1 19	0.84	0 04
B	-0.50	-1 21	-0 13
C	0 89	0.37	-1 38
D	0.78	0 13	0.66

A = Rural Multigrade
B = Urban Multigrade
C = Rural Non-Multigrade
D = Urban Non-Multigrade

Figure 1 illustrates that the plots divide the four groups depending upon their locations Group centroids are plotted in the canonical discriminant space defined by the first two discriminant functions—classroom management (I) and planning instructional activities (II). Locations of rural non-multigrade (C) and urban non-multigrade (D) groups on the positive sides of classroom management and planning instructional activities explain their distinct nature The two non-multigrade schools from a cluster indicating that they are relatively high in the classroom management and average in planning instructional activities It means that non-multigrade rural and urban groups plan instructional activities to a certain extent and manage instructional activities, time and learner involvement relatively well On the other hand, the emerging pattern is entirely different for rural multigrade (A) and urban multigrade (B) Rural multigrade group as compared to urban multigrade group is high in the management of classroom specific to multigrade situations. The two groups' difference is further sharpened by planning-instructional activities Rural multigrade group plans instructional activities relatively well On the contrary, urban multigrade group is below the level of rural multigrade group in the management of classrooms specific to multigrade situation and is extremely low on planning instructional activities

Location of groups on the plane of classroom Management (I) and instruction for learner involvement (III) differentiate the multigrade and non-multigrade groups further Though rural and urban non-multigrade groups (C and D) have same level of classroom management they differ considerably in providing instruction for learner involvement While rural non-multigrade group (C) makes relatively higher effort to provide instruction for learner involvement, the effort to provide instruction for learner involvement, the effort of the urban non-multigrade group (D) is extremely low Though rural multigrade group (A) maintains higher level of classroom management specific to multigrade situation than the urban multigrade group (B), both groups are low in providing instruction for learner involvement If providing instruction for learner involvement is a major component of classroom transaction, then rural non-multigrade as compared to the remaining three groups, makes relatively high effort in providing instruction for learner involvement Among the remaining three groups while both rural and urban multigrade groups are low, the urban non-multigrade group is extremely low in providing instruction for learner involvement.

Location of groups on the plane of planning instructional activities (II) and instruction for learner involvement (III) provides further insights into the differences between groups Though rural multigrade group (A) make relatively higher effort as compared to the rest in planning instructional activities, they are weak in providing instruction for learner involvement

Urban non-multigrade group (D) attaches importance to planning instructional activities to a minimum level but the group is extremely low in providing instruction for learner involvement On the other hand, rural non-multigrade group (C) stands apart from the rest in the sense that the group shows relatively high degree of effort in planning instructional activities and providing instruction for learner involvement. However, urban multigrade shows entirely a different picture. The group is low in both planning instructional activities and providing instruction for learner involvement. Infact, these evidences substantiate the earlier findings highlighting the teachers' needs for subject specific training with the focus on child centred activity based interactive mode of transaction based on a data from the DPEP district, Hissar (Khader, Rath, Shrimali and Arya, 1996).

The above evidences explain the answers to the research questions two and three. With respect to the question on major variables that differentiate the multigrade and non-multigrade groups, the evidences suggest that classroom management, effectiveness of classroom management and organisation of lesson—selection of activities are the significant and most powerful in discriminating the various groups. Though less powerful, variables such as instructional strategy—effectiveness, instructional strategy—total, learner involvement, attention to individual learning and innovative practices have important consequences in differentiating the groups.

With regard to the question on the pattern of differences in classroom transaction among the groups, explanation is based on the factor pattern derived from canonical discriminant analysis. The groups are well differentiated on the planes of derived functions/factors—classroom management—planning instructional activities, classroom management—instruction for learner involvement and planning instructional activities—instruction for learner involvement. What is emerging is that it is more appropriate from strategic planning perspective to differentiate the groups based on functional dimensions or characteristics. Each group, rural multigrade, urban multigrade, rural non-multigrade and urban non-multigrade shows distinct pattern of differences on the planes of discriminant functions. The planes of the functions reflect the context of the group Infact, each group has a distinct context.

Evidences for Policy Planning

The emering evidences point out that the prevailing level of classroom transaction in multigrade and non-multigrade schools is below average. If we consider the mean values of the variables contributing to the three functions, then all the groups—rural multigrade, urban multigrade, rural non-multigrade and urban non-multigrade—are all below average level.

This mirrors the existing level of classroom transaction in these DPEP Schools

Rural multigrade, urban multigrade, rural non-multigrade and urban non-multigrade are differentiated well on the planes of classroom management and planning instructional activities, classroom management and instruction for learner involvement, and planning instructional activities and instruction for learner involvement. Rural and urban non-multigrade groups maintain classroom management relatively well and plan instructional activities to a certain extent Despite similar level of classroom management, rural non-multigrade group makes effort to provide instruction for learner involvement Certainly urban non-multigrade is extremely weak in providing instruction for learner involvement.

Among multigrade groups, rural multigrade maintains relatively high classroom management specific to multigrade situation and plan instructional activities. Though urban multigrade maintains classroom management to a certain extent, the group is considerably low in planning instructional activities. However, it is highly visible that both multigrade groups are weak in providing instruction for learner involvement.

These evidences pointout that identification of the context of school is essential for strategic planning. Location of groups on the planes of derived functions explain the context and suggests the strength and weakness in relation to the existing level of classroom transaction.

From strategic planning perspective urban non-multigrade groups require training inputs to promote instruction for learner involvement to desirable level. Equally important is to provide training inputs to strengthen the existing levels of classroom management and planning instructional activities in urban non-multigrade as well as the classroom management, planning instructional activities and instruction for learner involvement in rural non-multigrade group.

Both rural and urban multigrade groups need training inputs to build the capacity to provide instruction for learner involvement. Training inputs on planning instructional activities is a major need for urban multigrade However, training inputs are needed to strengthen the existing level of classroom management and planning instructional activities in rural multigrade as well as the classroom management in urban multigrade.

The evidences mirror the quality of training programmes received by the teachers of these DPEP Schools. What they require is need specific training programmes if the objective is to improve the classroom transaction.

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School Effectiveness and Classroom Processes at Primary Stage in Tribal Areas

N.K. Ambasht

The study suggests that the need of the hour is to draw up a curriculum suited to the needs of each tribe within the broad framework of the MLLs This would help in the fulfilment of the proclaimed policy to make education an integral part of the culture of the people whom it intends to serve There is a need to take conscientious steps to check the alienation of the tribal children from their cultural moorings Collaboration between social anthropologists and universities for systemic studies, applied in nature need to be taken up. The curriculum transactors need to be provided reorientation for emphathising with the cultural imperatives. Suitable training programmes need to be designed on the basis of systemic research on recent ethnographic account and data. The study also suggests the need for adopting ungraded school system with comprehensive continuous evaluation. A case has been made for decentralisation of curriculum planning, curriculum development, transaction and approaches, and evaluation procedures.

INTRODUCTION

True education acknowledges the mind to be a living thing and, therefore, stimulates it to give out more quality and quantity than is imparted to it from outside. Education, in order to be meaningful, has to be in full consonance with our entire life—economic, intellectual, aesthetic, social and spiritual. It should emerge from the core of our basic values and ethics. The real meaning of education is an approach for harmonious development of an individual in the context of the culture of the community to which he belongs.

The interaction between individual and his environment is of crucial importance in the process of education. The individual is, to a great extent, guided by the cultural environment around him. Education is, therefore dependent on culture and is related to culture studies

The tribal societies in India have distinctive cultural features Although "the tribal" can be distinguished from the dominant non-tribal cultures, yet within the "tribal" there is clearly distinctive cultural identity of each of the tribes There are ethnocentric cultural variations from tribe to tribe which are significant from the point of educational planning and approach

The process of the growth of a child in any society is basically a process of socialisation. In this process the child learns the language, particularly the one spoken by the family and in the immedaite environment. Slowly as its world expands from mother to family to neighbourhood and to community, its language vocabularly also goes on increasing from its personal needs to family needs, to neighbourhood needs, to community needs. Most of the words that it acquires in the process of socialisation becomes its basic voabulary that it understands.

The tribal societies in the past have been mostly closed societies as far as their contact or communication with far away groups were concerned Therefore, most of them did not develop any written language. Their need was met with verbal language or oral communiation. This meant that they had distinct grammar or language structure minus the written form. To fulfil the educational needs, as a socialising process, many of the Indian tribal communities had their traditional institutions such as Abors had the Mosup, Kuki, the Zwalbuk, Naga, the Morung, Garo, the Nokpanti, Oraon, the Dhumkuria, Gond, the Ghotul, etc. These institutions prepared the young ones to take up their roles as "socially useful productive members" of the community This author (1970) had done a detailed analysis of the functions of these traditional institutions and had seen them in the light of various learning theories of the modern day psychologists It is found that the practices in these traditional institutions had sound theoretical bases The theorisation is, chronologically speaking, a much later development than the institutions which were practising it!

These institutions were performing educational functions sans literacy. Since the societies were closed, in most cases, they did not feel the need of a script, but they had the language and numerical skills. The protagonists of modern education in the tribal societies immediately discarded outright these traditional institutions as these did not cater to the literacy needs (art of writing and reading), without even examining the possibility of suitable mutual adaptation of these institutions and the modern education system. Education may be good or bad, and its goodness or otherwise will be relative to the virtue, wisdom and intelligence of the educator. Notice that "good," "bad" and "virtue" are culture oriented values! What may be "good" or "virtue" for "us" may not be "good" or "virtue" for "them."

This distinction of "we" and "they" has led to a kind of patronising attitude build-up Sympathy has taken place of empathy. This "we" group arrogates to itself the responsibility of being "their" spokesmen with regard to their needs and takes an attitude of "savidur" and "sympathiser" In our eagerness to bring them at par with us we hasten to impose our education lock, stock and barrel without considering their cultural background and demand. Any demand for suitable adaptation is steamrolled with the argument of "our education" and "their education" which could be second rate if it is different from the former. The gap between these sympathisers or those tribal spokesmen who themselves have undergone the modern educational process (and rightly so because there was no alternative available)—and who are considered as largely marginalised folk having lost their cultural moorings in the process of their education—and the common folk is significant. The real-tribal living in remote area has hardly any say in the matter as the spokesmen are self-appointed people Case studies made by this author brought out the contrast in the views of these two sections (Ambasht 1970).

Literacy skills have now become a necessary tool in the process of education because they are indispensable sources of communication Wherever verbal communication is not possible literacy comes to the aid of the individual. In the educational system today, the books are necessarily the carrier of ideas, concepts, knowledge (leading to understanding) and development of skills (application). For any society, education is considered an important indicator. Literacy being the simplest and easily measurable aspect, its percentage in any society is taken as indicator of its development.

The people of India have enjoined upon themselves, through Article 46 of the Constitution, to promote with special care the educational as well as economic interests of the weaker sections of the people in general and of the Scheduled Tribes and Scheduled Castes in particular.

Considering this Directive Principle of the State Policy a number of schemes and programmes have been initiated or implemented such as schemes of incentives, financial assistance, establishment of ashram schools, establishment of hostels for boys and for girls, etc. The education of the children of the tribal communities has been engaging attention of all educational planners, as it is proving to be a hard core area in achieving universal elementary education This is acute in case of girls among the Scheduled Tribes Many investigative studies have been carried out into the causes of such a poor state of affairs in the development of education of the tribal children.

Non-suitability of the school programmes has been identified as a major cause for rejection of schools by parents. These causes have tended to persist even today Even now there has been hardly any progress in the direction of teaching children through their mother tongue (tribal dialects); the teachers themselves are from outisde, not knowing the mother tongue of the child, the books are written with alien environmental background and, mostly are translations of other language books into the tribal languages If at all these have been developed, there is no graded vocabularly list of the spoken words, no serious and scientific efforts have ever been made to tackle these academic issues in a systematic and scientific manner by those concerned.

It is felt that the education provided to tribal children was not geared to their life needs Since education is a subset of the social system, it has to keep pace with the demands of the society for which it is meant. As it happens, the dominant society somehow or the other tries to influence the tribal society. In such a process there occurs a great degree of social disequilibrium resulting in a chaotic situation in the social scenario More often than not, the clash of cultural values creates confusion leading to a maladjusted personality development and subsequent repercussion assumes a large proportion of turmoil, very often leading to separatist demands.

The delivery system of modern education also is not conducive to the demands of tribal societies, where economic and social needs get priority over what we call educational needs. There exists the "tribal" "non-tribal" prejudice or social distance among teacher and taught. Modern education is rapidly changing not only the lifeways but also the thoughtways of the tribal people.

With the expansion of the communication system, roads and transport in the interior tribal areas and advanced technology, which are very often taken as manifestation of civilisation, a dichotomy in cherished values and desired values is created It seems that there is an irreversible process because of multipronged attack being made on culture of hitherto secluded tribal societies. It is a social need that these societies should also benefit from the process of development, and because the dominant society cannot adopt their educational system, it tends to impose its own educational system on them In this process, it tries to prune the needs of societies according to its own system, rather than modifying the system to suit the needs of their societies.

The needs of the tribal societies are again in a state of flux One cannot come across an agreed view of what their need is.

The "ascribed" needs and the "felt" needs, although at variance at times, tend to get juxtaposed It is mainly because the opportunities for articulating felt needs are not available to the tribal people as such, Those who get such opportunities are the third parties who take on to themselves the role of being their spokesmen/representatives or at best, the elite tribals who themselves have lost their moorings in their traditional societies and are looked upon by their people as "drift away"

The school and society, in tribal areas are more often in "conflict situation" because of non-appreciation of tribal culture and values by the educators

Contraversies have arisen in many quarters that differential education leads to disparities and these kinds of education could be labelled as first or second rate education. This kind of argument appears to emanate from absence of insight into the basic foundations of education. The very purpose of education is to develop a fully adjusted personality of the child in his own culture with necessary attributes of knowledge, understanding, skills, habits, attitudes and values. As one would notice, these are culture related attributes and, therefore, education cannot be transplanted from one culture to another. It has to be adapted (not adopted) to the requirements or demands of the host culture. If it is not done, social disequalibrium would be the result.

Let us, for the present, restrict outselves to education of tribal children only at the primary level. The major learning outcomes remaining the same, it is very much possible to develop the curricula suited to the needs of each of the tribe in consonance with same learning outcomes and establishing parity in evaluation of children. Before we take up the content of education at the primary level, it may be worthwhile to consider the objectives of such an education. The Government of India have come out with a document which they call "Minimum Levels of Learning (MLLs)" (1991). These MLLs are largely what used to be Learning Objectives in the yore. Let us not go into the ninty-gritties of the differences in these. Suffice it to say that these learning objectives have undergone a series of metamorphosis to reach the stage of MLLs.

The objectives of Language learning at the primary levels, as has been given in the aforesaid document, are, to:

- be able to listen with understanding;
- be able to speak effectively in both informal and formal transactions;
- be able to read with comprehension and enjoy reading various kinds of instructional materials;
- be able to write neatly, with logical sequence and reading;
- be able to use grammar functionally in various context.

Now in order to achieve these objectives, materials could be developed in a language suitable to the specific needs of the tribe concerned. It may be noted that the need may be bilingual or multilingual. It may, therefore, be necessary to find out the felt needs of these people. Again, in order to inculcate or accelerate comprehension, the collection of spoken vocabulary of the children of particular age group would have to be made. This would be necessary for both the mother tongue as well as the second language of the tribe through which it communicates to the communities around. These vocabularly lists would provide us the base line for preparing texts. Once again, not only the collection of vocabulary is necessary but equally important is the local folk tales, folk songs, fables, stories, details of fairs and festivals, etc , so as to form the content of the lessons

Briefly speaking, the objectives as enunciated in the Government of India document can be met, provided we make efforts to produce materials *de novo,* without falling prey to temptations of copying, translating or adopting materials written elsewhere for a different clientele.

Similarly, let us now have a look at the objectives laid down by the MLL with regard to mathematics at the Primary Level

> "The mathematics curriculum at the primary stage should be directed to achieve the following objectives·
>
> Ability to
> - perform computations with speed and accuracy
> - translate verbal statement (a) in mathematical form using appropriate symbols, and (b) diagrammatically
> - make reasonably good approximations and estimate measurements
> - apply mathematical concepts and skills to solve simple problems of day-to-day life.
> - think logically
> - recognise order and pattern.
>
> "The key mathematical concepts for each class are not listed in order of instructional sequence but have been classified under the following five areas of mathematical competencies.
>
> (i) Understanding Whole Numbers and Numerals.
> (ii) Ability to Add, Substract, Multiply and Divide Whole Numbers.
> (iii) Ability to use and solve simple problems of daily life relating to Units of Money, Length, Weight, Capacity, Area and Time.
> (iv) Ability to use Fractions, Decimals and Percentage.
> (v) Understanding of Geometrical Shapes and Spatial Relationships."

Let us examine what mathematical skill is developed in the child when he grows up in his society? What functions does he perform in his daily life and play situations in which he uses this numerical skills? If we observe keenly the daily life of a tribal child in his work and play situations, we shall find that he knows the concept of whole numbers and, many a time, operates in systems other than decimal For example, in some society, they count by fives or Gahi, which to an enlightened mathematician is nothing but number system to the base 5. In still some other societies, they count by scores (twenties) or Kudi, which again is the number system to the base 20.

Various mathematical skills are in operation in the tribals' own world which has rationale as sound as ours Should we insist that they learn our way from the very beginning? Is it possible for us to develop some methods and materials to perpetuate their system and at some later developmental stage inculcate the logic of decimal system? Not long ago in our mathematical history had we tried to introduce the binary approach (to the base 2) but ultimately we abandoned it as we could not adapt to a new system. Similar difficulty is felt by a tribal child when he starts operating in tens instead of his "fives" or "twenties." What can we do to let him grow with the system and transfer to decimals in a smooth manner in course of time? These are some issues which we need to consider in the light of the cultural context of the tribe concerned. Perhaps we may have to undertake researches to answer these questions in each tribal community.

Now let us look at the Environmental Studies. Ten major competencies have been listed in MLL document.

They are:

"The pupil

(i) Acquires awareness about one's well-being in the context of social and natural environment.

(ii) Explores important aspects of one's socio-civic environment and comprehends their working.

(iii) Knows about various people at work and appreciates the importance about the "world of work "

(iv) Understands and interprets the spatial and interactive relationship between man and his environment.

(v) Begins to see the relationship between man's past and present, and to hold the past in its proper perspective.

(vi) Senses common but simple and easily observable socio-economic situations and problems, analyses them and seeks possible solutions at his level of experience.

(vii) Understands the factors contributing to the preservation of good health.

(viii) Develops skill in gathering and classifying information about living things from one's environment, and drawing simple inferences.

(ix) Observes and examines some common characteristics of non-living things.

(x) Observes simple phenomena on the earth and in the sky and draws inferences.

It may be relatively easier to see these objectives of Environmental Studies in the perspective of the tribal's environment which is rich in natural flora and fauna. As far as concepts related to social sciences are concerned, the tribal child is already conversant with many a social institutions like the family, home, village, panchayats, etc. The modern social institutions like post office, hospital, school, district administration, etc., were not his immediate and early experience, some thirty years ago, but now, to a large extent, they have made their presence felt in tribal areas, except, of course, in some remote areas, which may still not have these.

The environmental concerns, specially those related to conservation of forests, flora and fauna, are more manifest in tribal cultures. The totems, worship of trees and animals all are directed towards conservation It is also true that these customs, totems and taboos did not articulate the logic or nationality of these practices So the materials that can be developed for these people may base on their customs, totems, taboos, etc , and build upon the logic of each of these practices. This is no simple task. The rationality of each of these will have to be investigated. While doing so, cause-effect relationship, which is the basis of all scientific process, could be developed and other sceintific facts could be explained The scientific temper, therefore, can be inculcated more easily and smoothly among them than is presently perceived.

It is not our purpose to go into further details of gradation and sequence of learning objectives in each of these areas, neither are we trying to break up these competencies into sub-competencies. Proposing any syllabus specific to the tribal children or a curriculum is not the domain of this paper now, because this is a fairly detailed exercise and requires more time and space to justify its development and presentation here. What is needed to be emphasised is that it is possible and desirable to draw up a curriculum suited to the needs of each tribe within the broad framework of the MLLs and that it would be a fulfilment of our proclaimed policy to make education an integral part of the culture of the people whom it intends to serve. As of today it has alienated the tribal children from their cultural moorings. Education is a tool for one's development within one's own cultural context If we take some conscientious step in this direction, we would not only be perpetuating development and self-esteem in these children but would also be checking the fissiparous tendencies in these communities for reasons so obvious.

The involvement of the Social Anthropologists and Universities have also been wanting, specially where interdisciplinary approach involving anthropologists and educationists are concerned. It is high time that a greater collaboration is worked out between these two departments and systemic studies applied in nature are taken up. There is a need to take up research projects, both action and applied in this particular area Non-formal education is more suited to genre and genius of the tribal societies but there is a particular need for the anthropologists and non-formal educationists to join hands to overcome this mammoth problem.

Greater inter-disciplinary studies in education and social anthropology is the need of the hour. There is also a need for setting up groups of people trained in social anthropology and pedagogy both (specially curriculum and material development) for each of the major tribal areas These groups must address to learning materials in consonance with the overall national curricular framework including ten core components. The groups would take up the work of developing curriculum (since they are trained in it) and materials in the context of linguistic and cultural background of these tribes.

The transactional processes will also have to be reoriented to mesh-in the specific requirements of the cultural imperatives of each of the tribe. Therefore, the task of reorienting the curriculum transactors will assume greater importance, not only in terms of knowing the tribal language but also empathising with the cultural imperatives. Therefore, the need for in-service training programmes of sustainable outcome (may be recurrent) for the curriculum transactors will be of paramount importance. The programme and content of such training will have to be developed with respect to the tribe concerned. Naturally this will require a systematic research of recent ethnographic account and data to be used as a foundation to such training courses.

The learning among the tribal children is often beset with learning difficulties which are usually not appreciated by the teacher. Ambasht (1994) mentioned, for example, the learning problems of tribal children who have native number system to the base 5 to 12 or 20. In order to help them learn and progress according to their pace adoption of ungraded school system with comprehensive and continuous evaluation based on diagnostic and remedial evaluation-teaching-learning syndrome is necessary. S.L. Gupta's experiment (1976) and its success in Loni Block has established its viability. However, the curriculum transactors (teachers, supervisors, educational administrators in that order) will have to assimilate the letter and spirit of the programme otherwise it may be counterproductive. Ambasht (1995) made a case for adoption of this system in case of Non-formal Education, which may be extended to education of tribal children also. The scope of this paper does not permit time and space to go into the details of this approach but suffice it to say that action researches in this regard have established this approach as a practicable practice.

The relevance of socially useful productive work is extremely conspicuous in tribal communities as the child is exposed to world of work from rather early ages basically because of the daily-earning-economy in most cases The curriculum must take advantage of such a situation and must correlate itself to learning through work.

All these lead to one final conclusion that there is a case for decentralisation of curriculum planning, curriculum development, curriculum transactional approaches and evaluation procedures.

This has been substantiated by Ambasht and Rath (1995) in a study conducted for World Bank. The need of the hour is to develop action plans and implementation in right earnest.

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Identification of Learning Problems in Arithmetic and Remedial Teaching for Children in Standard I*

Sushil Kumar Goel

The study identifies various task levels and primary description for each level. In addition, various learning problems relating to arithmetic difficulties were also identified.

The sample of the study consisted of 40 children who had poor academic achievement in arithmetic in Upper KG and standard I, with IQs ranging from 95 to 120. The findings indicate that errors in problems at abstract level are significantly greater than those at representational level. Faulty methods of teaching and evaluation were the major factors impeding students' achievement Observations of students indicated that in many classrooms students were simply required to complete innumerable worksheets.

Results show that since most of the textbooks are based on problems at abstract level, they need to be re-looked into and teachers need to be oriented in handling the subject in an efficient manner.

INTRODUCTION

Except for children with reading, writing, spelling or behaviour problems, students who have difficulty acquiring a functional mastery of maths concepts and computational skills constitute the largest group of children In fact, the field of mathematics education currently has a serious shortage of teachers. "Mathematics" scare away many a young learners. This highly affects their career and their personal interest in the subject.

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*The experiment is in progress The author is developing arithmetic skills sequence which is essential for assessment and teaching of children in Standards I and II.

Objectives for pupils to attain should be relevant and contain useful content, skills and attitudes (Edger 1994) Mathematics is necessary to train a child to think, reason, analyse and articulate logically It is treated as a concomitant to any subject involving analysis and reasoning It is for this season that mathematics has been accepted as an integral part of general education upto secondary stage of education and a compulsory subject of study. Mathematics is once again being emphasised because of the economic forces affecting the business, computer, and industries. Currently there is a tendency to re-evaluate the concepts and presentation of mathematics curriculum and to emphasise instruction for girls, who have traditionally been discouraged in this area by implicit cultural imperatives.

As a basic skill, arithmetic is introduced according to a developmental scheme and certain operations should precede others but have less sensitivity to the developmental needs of individuals A more straight forward approach is to examine the steps or tasks in the skill sequence and the type of instruction Use of skill sequence is essential for assessment and teaching. The development of arithmetic skill is dependent on the ability to grasp underlying concepts rather than to respond with rote answers. Poor teaching is undoubtedly a major factor; observation of students indicates that in many classrooms students are simply required to complete innumerable work sheets, few concrete aids or manipulable instructional devices are rarely available, and operations are stressed without significant attention to concept development. Because less is known about the causes of arithmetic disorders, the approach should be to emphasise (a) the developmental process, (b) the tasks, and (c) the necessary concrete experiences, feedback and reinforcement There is no large experimental base for the causes of arithmetic disorders, most authors accept the causes of reading disorders as also causing arithmetic problems. Most of the authors include disorders of memory, visual perception, spatial ability, laterality, directionality, verbal ability, abstract thinking, and so forth.

Problems with spatial relationships may result in confusion concerning concepts that are basic to quantitative thinking For example, a child who does not fully understand the concepts of first-last, left-right, beginning-end, top-bottom, up-down, over-under, near-far, front-back is not ready for rational counting These spatial relationships are mastered during the preschool years as they are essential to quantitative thinking (Bryant and Kass 1972; Kaliski 1967), especially in differentiating between various numbers (e g 6 and 9 or 19 and 61 or 17 and 71). Directionality problems interrelate with spatial relationships. Reading proceeds from left to right, whereas addition, subtraction, and multiplication are calculated from right to left.

Traditionally arithmetic includes both verbal and written symbols. These symbols communicate such concepts as a quantity, size, order, relationships, space, form, distance and time. Problems in visual perception and visual motor association complicate maths. It is, therefore, necessary to identify learning problems in arithmetic and plan remedial teaching for children. The children of standard I in local schools of Bhubaneswar were taken up for study. The objectives of the study are: (i) to identify the various task levels and primary descriptors for each level, (ii) to identify various learning problems related to arithmetic difficulties, (iii) to identify the types of arithmetic errors and specific error patterns, (iv) to construct a test to effectively assess specific arithmetic skills, (v) to design appropriate remedial teaching techniques.

METHODOLOGY

Sample

The sample for the present study consisted of 40 children who had poor academic achievement in arithmetic in UKG and standard I but their IQs ranged from 95 to 120. Their daily work samples were examined to identify error patterns.

Tools Used

A questionnaire comprising various arithmetic problems on shapes, sizes, lengths, positions, number concept, addition, subtraction, place value, time concept, money concept, etc., was prepared at representational and abstract level. The opinion of five subject experts was obtained before administering it on each child individually.

Formation of Rapport with Subjects

In the beginning, some concrete materials, toys and attractive pictures were shown to each child with a view to build up rapport. If the rapport is complete, the child can be expected to put in his best efforts to cooperate with the experimenter, otherwise whatever responses she may give may not be reliable and adequate. The whole gamut of experiment is highly important in order to make the data reliable and meaningful. Aspect of rapport particularly has to be ensured when dealing with children with arithmetic disorders. Unless these children are sufficiently motivated it would not be possible to deal with them and it is equally important for the experimenter to feel absolutely at ease when dealing with them. During the initial interaction, most of the children apprised that they did not like "arithmetic" subject and at the same time they did not like their arithmetic teacher as well. Lack of rapport by the teacher with children might be the reason for disliking the subject The student must have enough confidence in the teacher, which alone can facilitate rapport establishment. The experimenter attempted to win their confidence by playing with them outside the classroom and by assisting the teacher in the regular classroom They were shown a large number of teaching aids and colourful toys having wheels and musical sound, the subjects enjoyed playing with these materials. This put them at ease and in some cases, the subjects even started describing their problems in great detail. After making sure they were relaxed, the purpose of the experiment was explained to them. They were told they would be shown colourful pictures, toys, some games of learning, etc After they understood the instructions clearly, the experiment would start. Whatever clarification they needed were given to them. Throughout the investigation, subjects were given sweets/candy after each session, in the hope of keeping their motivation constant Verbal reinforcement together with an incentive in the form of sweet/candy motivated the subjects well. All the subjects were interested in the experiment and appeared well motivated They endured much tedious work more cheerfully than the experimenter who was spurred on further research by their willingness and cooperation.

Testing Situation

The questionnaire was administered individually in a fairly spacious room in the school which was free from all distracting stimuli. The room had a table of medium size in which one could keep the test materials comfortably at the correct height for the subjects to see the materials being exposed. This room also had a comfortable chair for the subject and a chair for the experimenter. The experimenter sat opposite to the subject during the entire course of testing and experimentation work. Two curtains were also put up on the window and door in order to fixate the attention of the children on the task and to avoid the distracting influence from outside. The child has been all alone in each session with the examiner and parents/teachers were not allowed to come in the testing room. In the case of very young child it was necessary to have the mother come into the examining room and then withdrew as soon as she became adapted to the testing situation because her presence tended to inhibit spontaneity and to act as a distracting influence that interfered with the establishment of rapport between the child and the examiner. In school, interruptions were apt to occur even over a "Please-Do-Not-Disturb" sign on the door Testing had to be discontinued during interruption but

In each case the exercise of tactful consideration on the part of the examiner always terminated interruption promptly. The duration of testing time was never more than one hour for a child and the signs of fatigue, weariness or loss of interest were not noticed at all. The examiner has been extraordinarily careful in arranging his testing material so systematically that he had not to waste time fumbling around to find the needed card, block, bead, watch or pencil. A file having response sheets, stop watch, pencil, etc., were placed near the experimenter's chair which was beyond the subject's vision and helped to take down subject's responses. It has been noticed by many examiners that a subject is distracted by watching the recording of his responses, especially the record of his successes and failures as + or – Thus it was decided to substitute tick mark ✓ for (+) symbol and ✓✓ for (–) symbol. Every possible effort was made to maintain optimum testing conditions, and the room was kept comfortable and pleasant for the subject throughout investigation.

Levels of Arithmetic Tasks

Generally, maths tasks are presented to youngsters at concrete, representational, and/or abstract levels. Table 1 illustrates the task levels in maths, primary descriptors and examples. The concrete, level involves the manipulation of objects. For example, in teaching addition problems involving sums of 8, a concrete level activity should consist of having the student group eight blocks into all possible combinations of 8 (e.g 6 + 2, 5 + 3). The abacus is also a popular device for providing youngsters with concrete experiences in maths. Some students also demonstrate their need for or reliance on concrete level activities by counting on their fingers when requested to complete a simple addition problem

TABLE 1
Task Levels in Maths

Level	*Primary Descriptor*	*Example*
Concrete (C)	Manipulation of three dimensional real objects	Student manipulates blocks or abacus when solving simple maths problems
Representational (R)	Graphic representations of objects or items (primarily two-dimensional)	Student completes worksheets that feature dots, lines, or pictures to form maths tasks: 0 0 0 + 0 = ______ 0 0 0
Abstract (A)	Only numerals are used in performing maths tasks	Student is given only numerals (e.g 5 + 3 = ——)

The representational level involves working with illustrations of items in performing maths tasks Items may include dots, lines, pictures of real objects, or nonsense items, students demonstrate their reliance on this level by supplying their own graphic representations. For example, the student uses slash marks while solving problems like

3 + 4 = ———
111 + 1111 = --------- (Pupil's writing)

The abstract level involves working only with numerals to solve maths problems. Students who have difficulty with maths usually need extensive experience before they can perform and understand maths at this level.

Procedure

The questionnaire was administered individually on forty subjects of standard I studying in different schools. Part I of the questionnaire comprised of thirty-four questions at representational (R) level and Part II comprised of fourteen questions at abstract (A) level. Part I was administered in the first session and part II was administered in the second session on the following day. In the third session, all the items at representational level were replaced by concrete materials and the data were collected on all thirty-five test-items In the fourth session, all the abstract items were replaced by concrete materials and data were collected on all the fourteen questions. Each part carried eighty marks and the time limit was one hour in each session.

RESULTS AND DISCUSSION

Analysis has been done for the data collected in four sessions at R, A and C levels and given in Tables 2 to 5.

TABLE 2
Analysis of Data for R and A Levels

	Levels	
Measures	*Representation Level (R)*	*Abstract Level (A)*
Mean	53 00	37.00
S D.	6.64	4.16
N	40	40

$t_{(R,A)}$ = 12.94 (Significant, $p < .01$)

TABLE 3
Analysis of Data for R and C Levels

Measures	*Levels*	
	Representation Level *(R)*	*Concrete Level* *(C)*
Mean	53.00	68.00
S. D.	6.64	5.36
N	40	40

$t_{(R,C)} = 11.11$ (Significant, $p < .01$)

TABLE 4
Analysis of Data for A and C Levels

Measures	*Levels*	
	Abstract Level *(A)*	*Concrete Level* *(C)*
Mean	37.00	61.00
S. D.	4.16	10.45
N	40	40

$t_{(A,C)} = 13.48$ (Significant, $p < .01$)

TABLE 5
Analysis of Data for (R+A) and C Levels

Measures	*Levels*	
	Abstract Level *(R+A)*	*Concrete Level* *(C)*
Mean	90.00	130.00
S. D.	9.93	15.29
N	40	40

$t_{(R+C,A)} = 13.86$ (Significant, $p < 01$)

Analysis of Data for R and A Levels

Table 2 gives the data at R level collected in the first session and at an A level collected in the second session. The mean score 53.00 at R levels is much higher than the mean score 37.00 at A level and there is significant difference between both the task levels ($t_{R,A} = 12.94$, $p < 0.01$). This shows that the performance of students at R level is far better than their performance at A level. Mathematics is a subject which manipulates elements, most of which are abstract. This makes mathematics a little more difficult to teach as well as to learn. Abstract or symbolic thinking difficulties interfere with the youngster's ability to conceptualise the relationship between numerals and the objects represented by them

Analysis of Data for R and C Levels

Table 3 gives the data at R level collected in the first session and at C level collected in the third session. The mean score 68 00 at C level is much higher than the mean score 53.00 at R level and there is significant difference between both the task levels ($t_{R,C} = 11\ 11$, $p < 0.01$) This shows that the performance of students at C level is far better than their performance for the corresponding items at R level. Arithmetic is regarded as a branch of mathematics; it is concrete in nature, dealing with concrete entities and primarily with the science of numbers and computation. The primary problems of young children seem to be in computation skill (Otto, McMenemy & Smith, 1973) and to a lesser extent, the interaction of reading with arithmetic. This is an accepted logical view of arithmetic disorders. Concrete and pictorial materials are effective means to develop mathematical concepts and skills. Their use helps children to understand the underlying structures and principles of mathematical concepts and skills. The results show that the children find it much easier to manipulate three dimensional concrete materials than the graphic representation of objects which are primarily two dimensional. All children go through the process of manipulating or putting together concrete materials, mathematics becomes more meaningful to them and their learning becomes more permanent Considerable over learning will be necessary for most children to gain mastery of basic combinations and computational skills. One primary factor related to arithmetic disabilities is the quality and degree of instruction. Most often ineffective or inadequate instruction causes maths difficulties. These students have environmental problems, not personal deficts. Use of concrete materials provides them an opportunity to explore new ideas, find ways of solving problems and mathematical relationships. The sense of accomplishment helps to sustain the interest of the child in mathematics.

Analysis of Data for A and C Levels

Table 4 gives the data at A level collected in the second session and at C level collected in the fourth session. The mean score 61.00 at C level is much higher than the mean score 37.00 at A level and there is significance between both the task levels ($t_{A,C} = 13.48$, $p < .01$) This shows that the performance of students at C level is far better than their performance for the corresponding items at A level. To Piaget, mathematics is a direct extension of logic, so it is impossible to separate the two In arithmetic the child must consciously think about the structures (mental) that are being used Therefore, arithmetic is not computation and rote memorisation of tables, it is logic Determining what level of logical functioning a child has attained will aid the teacher in determination of which skills in a sequence should be introduced. Of course, all activities must be concrete and based on interactive events. The wide use of workbooks and worksheets is contrary to good teaching practice unless students have ample opportunity to gain concrete experiences with many kinds of objects in a variety of learning experiences. Mathematics programmes, as implemented by teachers, tend to depend on workbooks and seatwork activities. The child may be limited to a narrow range of learning experiences; additional activites may be unstructured and uncoordinated. Many children lack sufficient interactive and concrete experiences necessary for the development of basic arithmetical concepts. It seems that most teachers in elementary school are much less interested in teaching mathematics than other subjects. Even with the innovations of new maths and discovery approaches, much of arithmetic instruction has been based on rote memorisation; remedial programming tends to focus on rote learning and computational facilities with algorithms.

Analysis of Date for (R+A) Levels and C Level

Table 5 gives the data at (R+A) levels collected in first and second sessions, and at C level collected in third and fourth sessions. The mean score 130.00 at C level is much higher than the mean score 90.00 at (R+A) levels and there is significant difference between both the combined (R+A) levels and C level ($t_{R+A,C} = 13.86$, $p < 0.1$). This shows that the performance of students at C level is far better than their performance for the corresponding items at (R+A) levels. The findings clearly reveal that actual manipulation of concrete objects is essential for alteration of mental structures and development of concepts. Two-dimensional worksheets, verbal instructions and use of abstract symbols fall short of the criteria for optimum learning. Arithmetic materials and activities were arranged for each child to maximise learning through inexpensive concrete learning experiences. The findings reveal that many youngsters need extensive experience at the concrete and representational level before they can handle arithmetic problems involving only abstract symbols (numerals)

Stages of Mathematical Development

One useful approach to understanding the connection between the arithmetic curriculum and cognitive development is through the work of Piaget

(1958; 1963, 1965, 1974) Many authors relate mathematics to *cognitive developmental stages* The developmental stages of Piaget as described by Pinard and Laurendeau (1969) are often incorporated into maths programmes, it is apparent that a specified degree of quantitative thinking is needed at each level. For example, the pupil who can solve the problem 3 + 2 = ------- but cannot solve the problem 2 + 3 = ----- lacks quantitative thinking. Also, the child who can work $+^{3}_{2}$ but not 3 + 2 = ------ cannot yet think quantitatively. *Primary Mathematics Today* (Williams and Shuard 1970) extends from preschool through secondary levels and is based on Piagetian descriptions of normal child growth and development. Possibly no other human being has provided so much insight in the logic-mathematical learning of children as Jean Piaget As a stage theory, certain cognitive abilities are believed to permit the understanding and use of specific kinds of arithmetic skills within each stage. In his book *How Children Learn Mathematics,* Copeland (1979) lists the ages at which mathematical concepts develop. During the sensorimotor stage (birth to two years), the child learns through sight, sound, smell, touch and taste to recognise objects Rudimentary concepts of time, symbolic thinking and cause and effect relationships occur in the sensorimotor stage During the pre-operational stage (2 to 7 years) one to one correspondence and simple association of sets are managed This stage has two parts: (a) Pre-conceptual stage (2 to 4 years) — the child gains experience by trial and error At this stage the child is still egocentric and only capable of seeing things from his/her own point of view, (b) Intuitive stage (4-7 years)—the child is acting through intuition and previous experience, not through logical reasoning. Gradually the child begins to associate objects with each other and to be aware of numbers. During the concrete-operational stage (7 to 11 years), logical thought and operations begin The child begins to understand the basic ideas of mathematics (subtraction, multiplication, divison, fractions, and word problems), can classifly groups of objects logically and can arrange objects in order During the *abstract thinking stage* (11 years onward), young children begin to deduce and to consider concepts which are not necessarily concrete ideas. They think on a hypothetical level and reason problems through It is a period of great mental development when a fund of factual knowledge is gathered and the skills of language, numeracy and reasoning are built up. Certain milestones of classical Piagetian theory can be used to determine abilities of students to grapple with certain kinds of problems Although Piagetian theory can not be used as the basis for a curriculum, it can be extremely useful in determining the nature of learning activities as well as the order of introduction. Piaget theory can be summarised in terms of direct implications for understanding cognitive development

Vitale (1982) illustrated a pleasantly simplified table showing the modes of consciousness as they relate to separate hemispheres

Left Hemisphere	*Right Hemisphere*
Linear	Holistic
Symbolic	Concrete
Sequential	Random
Logical	Intuitive
Verbal	Non-verbal
Reality-based	Fantasy-oriented
Temporal	Non-temporal
Abstract	Analogic

It is obvious from this table that the hemisphere specific functions of both sides of the brain are essential for efficient output in the maths performance demanded of students in our educational system. It is generally accepted that children learn in four steps: concrete, pictorial, symbolic, abstract. This means that we believe learning begins in the right hemisphere and remains predominant by right-brained throughout the first two stages, concrete and pictorial. There is a switch to the left hemisphere during the symbolic period, and then another switch occurs at the abstract stage, back to the right. There is sufficient scientific evidence that the students of standard I between 5 to 7 years of age in his study are not yet ready to solve maths tasks at an abstract level when only numerals are used. The poor performance of the students at A level and the examination of daily work samples clearly reveal that these children should be taught at C and R levels. The children were taught sums only through numerals (abstract symbols) and were never taught at C and R levels. Most of the textbooks of mathematics in standard I have sums largely at A level and very few sums at R level are included. Consider the example where the addition of single-digit numbers is being taught in the class through the use of blocks. The children are placing sets of cubes on their desks and adding them by putting them together. There is movement, a kinesthetic element, that clearly illustrates the addition concept in that context. If, at this juncture, the teacher writes the horizontal addition statement 5 + 2 = 7 on the blackborad, one may say that learning is taking place in both hemispheres. But how can it be guaranteed? If the symbols on the blackboard have no meaning, the left hemispheres of many children will not even respond to that written equation. The teacher may even read out what he/she writes on the blackboard so that the children can hear the addition sentence. This multisensory approach should be successful. Unless the children understand that the numeral 5 represents the five cubes they have placed on the desk but can also represent five of any other items in another situation, the written algorithm remains meaningless and unconnected to the experience Actually, the children are still at the concrete stage.

Both mathematics educators and remedial clinicians agree that the use of multisensory manipulative and instructional aids should be actively encouraged Manipulative devices are used to give concrete expression to abstract ideas. They are the sensory avenues to developing mathematical concepts; they also function as evaluation tool to help determine the level of abstraction used by an individual child The wide variety of aids used in this study may be classified as·

1 Coloured beads, blocks, pebbles, rods, discs
2. Number boards
3 Place value devices
4 Abacus
5. Measurement devices
6. Cards and charts
7. Geometric shapes
8. Coins and currency notes
9 Model clock

Learning Problems and Specific Error Patterns

Understanding maths problems of youngsters is enhanced by examining several factors of arithmetic functioning. The problems of perception, directionality, abstract thinking, memory, spatial ability, verbal ability are related to arithmetic disabilities. The following learning problems were identified related to arithmetic difficulties

1 *Memory Problem.* Many arithmetic tasks require good memory skills It was found that some children could not recall the name or shape of specific numbers or number facts. Some children could not arrive at the correct answer at all but some children arrived at the correct answer in a slow and inefficient manner.

2. *Reading Problem:* Although many students who have arithmetic disabilities are excellent readers, reading is a contributing factor to some children with maths problems. Some children were not able to read word problems. Also, some children misunderstood the directions on a maths worksheet Some children were unable to translate word problems to basic algorithms; others had difficulty finding the essential mathematics task involved in a problem. Following were the factors in the inability to translate:

(a) Unsuitability of text material to reading level
(b) Lack of instruction in reading arithmetics texts.

(c) Poor knowledge of vocabulary
(d) Little understanding of charts
(e) Confusion of symbols.

3 *Language Problems:* Many teachers believe that dyslexic children fail in mathematics because mathematics is yet another language to be learned. They plead that the language of mathematics must be taught directly to these children, with much emphasis placed on terminology. Experience frequently shows that the missing link is that the child is not given the opportunity to use his own language to state what he has been learning and what he has understood. The student's own language is more meaningful to him, his words are the bridge to comprehension, and the teacher's job is to "channel" that information into the expected mathematical terms In order to teach and/or to learn maths facts, one should master the language used in describing and computing maths facts. The demand of comprehension is on information processing and language facility. In arithmetic, however, concrete logicomathematical operations and language must have a corresponding relationship. Spoken language problems may also result in maths disabilities, youngsters may have difficulty learning the "language" of arithmetic. *Borrowing, carrying, times,* and *equals* have specific meanings in calculations The teacher should determine reading, conceptual, and language levels involved in any written maths problems. Even in standards I or II maths work frequently requires a mastery of reading levels of around standards V or VI Moreover, the language of directions can be very ambiguous to some children. On examination of daily work samples, it was found that the children were asked to "circle the larger number," some children had done as directed and yet many of their problems were marked wrong.

1. ㉕ paise or.5 rupees
2. 3 hours or ⑮ minutes
3. ② feet or 1 yard
4. 1 foot or ③ inches.

These examples point out that a child must have a certain level of understanding before he/she can deal successfully with the abstractions of most written maths problems. Such children are usually referred for resource help Although written materials should be used with the referred child during the analysis to determine his/her specific capabilities to deal with the reading, conceptual, and linguistic aspects of maths, the resource teacher should note how the classroom teacher demonstrates, explains and accounts for these parameters in the materials to be taught

If the student can show and not tell, then additional work with vocalising or writing should accompany maths activities to be sure that language and cognition are developing in a parallel fashion

4. *Cardinality Problems* Although many children are introduced to numerical concepts through the verbal descriptions of parents and peers about objects (e g. big, little more than), most teachers recognise counting as the first true arithmetic activity. However, many experiences with numbers precede counting and the basic arithmetic processes Cardinality or classification is based on set theory. Some students did not have a concept of cardinality, that is different sets of objects had different members.

5 *Ordinality Problems*· Some children did not have a concept of order but represented fourth, fifth and sixth in a sequence The children were able to perform rote counting but could not use the concept of order.

6 *Symbol Association Problems.* Some students had a concepts of cardinality and ordinality, but were not able to associate symbols with the underlying concept (e g. 5 = 00000)

7. *Symbol Confusion:* Some students confuse numbers, although they have a concept of numeration. For example, some children confused 6 with 9 and 3 with 8.

8. *Inability to Group Sets* Given two sets (00) and (000), some students were unable to merge them into a unity or new set (00000)

9. *Lack of the Concept of Place Values.* The place values (ones, tens, hundreds, and so forth) are not understood. Some students had a concept of number, but symbolising numbers as place values were not learned. A more concrete step is usually required, such as the use of an abacus, sticks, notebooks, strips of 10 squares, etc.

10. *Inability to Dissociate Sets Subtract.* Some children were able to combine sets but unable to reverse the process. With the help of concrete objects like beads, seeds, blocks, etc , they were able to reverse the process. Thus concrete form should be examined before dealing with numerals

11 *Lack of Mastery of Computational Skills.* A variety of this type of problem require careful analysis to determine the error pattern

(a) *Response*

$$\begin{array}{rl} (423) & \text{Substracts} \\ +\ 645 & \\ \hline 222 & \\ \hline \end{array}$$

Error pattern· Wrong operation. The student subtracts when he should add

(b) *Response*

$$\begin{array}{rcr} 21 & \qquad & 28 \\ +\ 34 & & -14 \\ \hline 53 & & 13 \\ \hline \end{array}$$

Error pattern Obvious computation error. The pupil applied the correct operation but makes an error in recalling a basic number fact.

(c) *Response*

$$\begin{array}{r} 24 \\ +\ 15 \\ \hline 12 \\ \hline \end{array}$$

Error pattern: Defective algorithm. An algorithm includes the specific steps used to compute a maths problem It is the problem-solving pattern used to arrive at an answer. An algorithm is defective if it does not deliver the correct answer. In the above response, the child who adds 24 + 15 by adding each number without regard for place value (e g. 2 + 4 + 1 + 5 = 12) is using a defective algorithm because the correct answer is 39.

(d) *Response*

$$\begin{array}{r} 67 \\ +\ 2 \\ \hline 89 \\ \hline \end{array}$$

Error pattern· In adding the tens column, the single digit number is added to the numeral in the tens column (i.e the lower addend is added twice).

(e) *Random Response:* In a random response no discernable relationship is apparent between the problem-saving process and the problem. For example, random responding consists of guessess that do not even involve estimates.

12. *Other problems.* Written language problems contribute to arithmetic disabilities. For example, the youngster who has difficulty spacing numbers correctly alligns problems incorrectly.

$$\begin{array}{rcr} 42 & \text{is written as} & 42 \\ +\,15 & & +\ \ 15 \\ \hline \end{array}$$

Some children cannot copy arithmetic problems from the blackboard or the textbook.

$$\begin{array}{rcr} 42 & \text{is copied as} & 24 \\ +\,36 & & +\ \ 89 \\ \hline \end{array}$$

Arithmetic disabilities exist at all age levels. During the preschool and primary years, children with this problem cannot sort subjects by size, match objects, understand the language of arithmetic or group the concept of rational counting. Without intervention, youngster persist in making systematic errors for long periods of time (Cox 1975)

The questionnaire was prepared at R and A levels based on several textbooks used in the country The performance of the children at R level was far superior to the performance at A level Assessment for intervention aids in individualising instruction to meet a student's identified educational needs It relies on informal teacher made tests, interviews, observations, task analysis, and criterion-referenced tests. Assessment for intervention also includes evaluation of pupil progress and programme effectivensss. It allows us to combine the teaching and learning processes. Through assessment for intervention, educators are able to determine qualitative differences in the way students think and they can use that information to decide what do teach and how to teach Understanding how students learn and their level of mathematical conceptual development are important prerequisites to instructional intervention The intervention was based on providing concrete experiences to the children The problems presented to the child in the questionnaire at R and A levels were re-arranged around concrete experiences. The reason is based on the Piagetian theory of equilibrium The findings reveal that the performance of all students at C levels is far superior to performance at R level. After considerable experience with objects the child acquires the meaning of counting and can use it as a skill in a rational manner According to Piaget, a new set of mental operations is acquired. The important fact for teaching is that concrete examples should be used liberally and continuously If the problem can be reduced to a physical model, learning can occur more easily The most important aspect of teaching is the development of arithmetic concepts The student should be given sufficient opportunity to experiecnce arithmetic concepts at a concrete level. Many classical Piagetian tasks are appropriate for teaching and testing Children develop arithmetic concepts through the actions they perform on objects, this is a basic Piagetian principle This approach most often relies on the structured presentation of a concept using concrete representational-abstract symbolic experiences. Thus, the teacher should first begin with a concrete level task using blocks or other suitable three-dimensional objects. Representational level tasks follow the concrete level activities and consist of using dots or other graphic symbols After completing activities at the representational level, pupils move to the abstract level. At this level, they use actual numerals Number is an idea which does not exist physically It is something we think The cognitive concepts like cardinality. Ordinality, one-to-one correspondence, Algorithm, Addition, Subtraction, etc., should be taught systematically by using concrete experience. Each of these cognitive concepts is essential to student's understanding and their ability to abstract complex mathematical operations Teachers must determine the students level of mathematical readiness and plan instructional interventions that harmonise with students' level of concept development Teachers' knowledge of students' functional level with each of these mathematical concepts and their awareness of students' functional level with each of these mathematical concepts and their awareness of students' understanding at either the concrete, semiconcrete or abstract level serve as a solid foundation upon which to construct mathematical intervention strategies. Today Universalisation of Elementary Education is a national priority. Since most of the drop-out cases are being reported in standards I and II, the present study was taken up The primary academic problem of numerous students in Maths. Most of the textbooks are based on problems at abstract level and the students in standard I do not have mathematical readiness The author intends to conduct an orientation programme for the teachers with a view to utilise these findings, improve teaching-learning process and minimise drop-out rate at primary level

RECOMMENDATIONS

Remediation should focus on basic facts, computational processes, and application to practical problems. To approach this logically, the author makes the following recommendations:

1. Concrete experience should precede use of graphic representations and this in turn should precede use of numerals. C-R-A levels sequences should be followed.
2. Drill on simple combinations (Addition/Subtraction) should be presented only as a method of overlearning responses for practical usefulness after each process is learned at the concrete level.
3. De-emphasise the traditional rote activities and arrange concrete learning activities. Rational counting is the ability to truly count; rote counting is a memorised meaningless activity because the child has neither knowledge of the counting process nor ability to apply it The development of arithmetic skill is dependent on the ability to grasp underlying concepts rather than to respond with rote answers. However, considerable overlearning will be necessary for most children to gain mastery of basic combinations and computational skills
4. Use a structured sequence of skills with associated activities appropriate for each task and concept.
5. Use of individual and small group instruction for activities at each skill level.
6. Reduce dependence on the use of written materials and worksheets

Understanding of Piagetian theory helps teacher to conceptualise an integrated mathematics programme that relies on structural learning, has a solid theoretical foundation and is one in which they develop their own methods based on students' needs. It may be necessary to develop students' mathematical language and vocabularly as a prerequisite to organising and sequencing information needed for decision making problem solving

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A Study of the Vocabulary Required by Class III Students to Achieve Mastery in EVS II as per the MLLs

P.R. Lalitha and N.R. Nagaraja Rao

The study analyses the textbooks of grade III to identify the vocabulary required by students to achieve mastery in the subject as per the stipulated MLLs. In addition, it also examines the correlation between assessed vocabulary levels and achievements in EVS II.

Textbooks for grade III in English and EVS were analysed. A list of vocabulary in both the subjects was prepared. Tests to assess the vocabulary levels of students in second language (English) and achievement in EVS were prepared and administered. Remedial instructions were designed highlighting vocabularly specially required by the students of general science.

The findings reveal that the performance in English remained unaffected by the remedial instruction The performance in EVS II showed a marked improvement

The study strongly advocates that a good science teacher must also be a good language teacher.

INTRODUCTION

To achieve mastery in any specialised school subject, the student has to gain knowledge from as many sources as possible, however good, the classroom learning may be. Textbooks, magazines, films, filmtrips, charts, video and audio materials are a few such sources.

At the elementary stage textbook is the major source of information. Knowledge presented in the textbooks has to be acquired by the students through reading Reading a textbook involves finding out what the author wants to convey through the passages. Knowing the meaning of the sentences presented in the textbook enables the child to correlate the ideas presented in the later sentences with those in the earlier ones.

Meaningful reading is thus essential for the child in order to gather the required information. "Reading comprehension involves understanding the meaning of a word/phrase beyond its literal meaning/recognition to the understanding of its meaning as intended by the author

Science students must be good "comprehenders." One of the factors on which good comprehension depends is a good vocabulary level and knowledge of specialised vocabulary to comprehend a special subject This is more so because the meaning of a work is different in different subjects For example, the word "root" conveys different meanings to a social scientist, a botanist and a mathematician. Hence, understanding the contextual meaning of a word is very important for a child learning science

To develop competence in the use of vocabulary possessed by a child in the right context, everything should be made easy for him in the hard job of reading. This becomes primarily important to a primary school child as he is confronted mostly with narrative and descriptive passage. Any textbook prescribed for a primary school child should hence use vocabulary known to him and used by him. He can later be gradually introduced to new words with illustrations to convey their contextual meaning. In this manner a transition can be made from spoken vocabulary to a broader vocabulary specific to the subject.

Science and social science textbooks in general, make use of a large number of technical terms making it difficult for the child to read and comprehend. The present study, therefore, is an attempt to find out whether the vocabulary acquired by the child till class III is adequate for him/her to comprehend the prescribed text of class III in EVS II and, thereby achieve mastery in EVS II as per the prescribed MLLs.

OBJECTIVES

The main objectives of the present study are:

- To analyse the EVS II textbooks of class III and identify the vocabulary required by students to achieve mastery in the subject as per the stipulated MLLs.
- To assess the vocabulary levels of students as per MLLs in EVS II
- To find the correlation between assessed vocabulary levels and achievement in EVS II
- To study the effectiveness of specially designed activities in helping children acquire the needed vocabulary for achieving mastery in EVS II

LIMITATION OF THE STUDY

The study was limited to students of class III studying in DMS.

Hypotheses

The following hypotheses were formulated.

- There is no correlation between the vocabulary level of students in second language English of class III and their achievement in EVS II.
- There is no significant difference between the achievement of students in EVS II before and after remedial instruction.

METHODOLOGY

The textbooks prescribed for class III students of DMS both in English and EVS II were analysed by a team of teachers from DMS and RIE faculty. A list of vocabulary in both the subjects were prepared based on MLLs (Annexure I). Tests to assess the vocabulary levels of students in second language English and achievement in EVS II were prepared and administered. These are appended as Annexure II. The date thus obtained was analysed by finding the mean, SD, and "t" value Analysis of the answers indicated that the poor performance in EVS II was perhaps due to poor vocabulary levels in second language English possessed by students. This was further supported by the sources they obtained in the English test.

It was felt that to improve the vocabulary levels of students it would be appropriate to impart remedial instruction. *Hence, exercises were designed highlighting vocabulary specially required by students of science.* These exercises were used in the classroom situation laying adequate emphasis on what the instructions actually meant. A number of such drilling exercises were used. A post-test containing items identical in nature with those given during pre-test was given both in second language English and EVS II (Annexure III). The results were analysed statistically.

ANALYSIS AND DISCUSSION

The pre-test scores were tabulated and the mean, SD and "r" between English and EVS II were calculated. The significance of the difference in means was tested using the paired "t" test (Tables 1 and 2). Using the correlation coefficient "r" between the pre-test and post-test scores in English and in EVS II separately, the reliability of the test was arrived at.

Scrutiny of the mean and SD (Table 1) in the pre-test indicates that the vocabulary level of students in second language English is not adequate to achieve mastery in EVS II This is reflected in the mean score obtained in the EVS II pre-test. The "r" between English and EVS II pre-test being significant, it implies that for a good performance in EVS II a good vocabulary level in English is a prerequisite Thus, a student who possesses a good vocabulary level performs well in EVS II

TABLE 1
Maximum Marks in the Test . 25

Subject	*Pre-test*		*Post-test*		*"t" values*	*Significance*
	Mean	*SD*	*Mean*	*SD*		
English	*9.33*	*5.39*	*9.39*	*5.14*	*0.113*	*ns*
EVS II	*7.14*	*5.19*	*10.35*	*5.34*	*6.42*	*Significant at 0.01 level DF=48*

TABLE 2
Correlation Coefficient "r"

English–EVS II (Pre-test)	0.810
English–EVS II (Post-test)	0.792
English–English (Pre-test)	0.766
EVS II–EVS II (Post-test)	0.788

Scrutiny of the mean, SD and 'r' of the post-test scores indicates the following:

(i) The performance in English remains almost the same, as the "t" value is not significant, i.e the mean is almost the same as in the pre-test.

(ii) The performance in EVs II shows a marked improvement as the mean increases significantly from 7.14 to 10.35 with a "t" value of 6.42.

(iii) the coefficient of correlation between pre-test and post-test scores
  (a) in English is 0.77
  (b) in EVS II is 0.79

The "t" value of the English tests did not change significantly as no additional input activities in *second language English* were given. A "t" value of 6.42 (significant at 0.01 level, DF 48) and the increase in mean from 7.14 to as high as 10.35 shows that the specially designed activities imparted to students have enabled them to perform better. It also reflects the fact that the students of class III did not have adequate exposure to answering questions from test papers which involved simple instructions. This may be attributed to poor vocabulary and in turn inadequate comprehension What one can, therefore, conclude from this is that, even though students were good in content, they were unable to comprehend weitten matter effectively. This is very much necessary if a student is to learn science from a textbook and perform the activities mentioned therein in the exercises. The message we get from this discussion is that all vocabulary required by a student to comprehend science need not necessarily be developed through a language lesson. Specific vocabulary required by science students should be developed through science lessons. *A good science teacher must also be a good language teacher* able to develop the needed vocabulary for science to help his students achieve better in the subject. Many a time the expected transfer of training from language to science does not occur due to difference in the contextual meaning of words referred to earlier. Textbook writers should, therefore, use vocabulary and sentence length in accordance with the level of the students and their ability.

The high correlation between pre-test and post-test scores in English and EVS points to the fact that the tests used were reliable

Suggestions for Further Research

This study can be extended up to class VIII in DMS, state schools and other CBSE schools. Also a study can be taken up to find out what influence vocabulary levels possessed by students have on achievements in EVS I and mathematics.

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ANNEXURE I

An exhaustive chapter-wise vocabulary list was drawn up based on EVS II textbook prescribed for class III A representative sample of vocabulary was short listed for remedial exercises and testing purposes The list is given below

1 Air
2 Amavasya
3 Areas
4 Atmosphere
5 Bathing
6. Banana
7. Beak
8 Bee
9 Body
10 Boiling
11 Breakfast
12 Breathe
13 Breed
14. Bright
15 Brushing
16 Bulk
17. Buffalo
18 Butterfly
19. Capacity
20 Chew.
21. Cloud
22. Cooking
23 Cool
24 Condensation
25. Cow
26 Crushed
27 Cutting
28 Day
29 Dry
30 Disease
31. Diarrhoea
32. Dissolve
33 Dog
34. Drop
35. Duck
36. Decay
37. Ears
38 Eagle
39 Earth
40. Eat
41. Eggs
42 Energy
43 Elbow
44 Evaporate
45 Eyes
46. Eagle
47 Feature
48. Feathers
49. Fingers
50 Fish
51 Float
52 Flesh
53 Flowers
54 Fly
55. Form
56 Frog
57. Freeze
58. Fruit
59. Food
60. Gauva
61 Germs
62. Gills
63. Gum
64 Hands
65 Healthy
66 Ice
67. Insoluble
68 Iron
69 Jasmine
70. Layer
71 Length
72 Lead
73 Legs
74 Lily
75 Liquid
76. Light
77. Lump
78. Lungs
79. Mango
80. Man made
81 Matter
82 Materials
83. Melting
84 Mosquitoes
85 Monsoon
86. More
87 Nails
88 Naturals
89. Neck
90 Nest
91 Night
92 Non-living
93. Nose
94. Organ
95 Owl
96 Palm
97 Parrot
98. Peeling
99. Pigeon
100 Plant
101 Prevention
102 Rain
103 Raw
104 Rising
105. Rose
106 Roots
107 Reproduce
108 River
109 Season
110. Sense organs
111 Sink
112. Skin
113. Sheep
114 Shape
115. Shake
116. Snake
117. Soft
118. Solid
119. Soluble
120. Soil
121 Sparrow
122 Speed
123. Sky
124 Stem
125 Steam
126. Substance
127 Sunflower
128. Swallow
129. Tiger
130 Time
131 Toes
132 Tomato

133 Teeth
134 Tongue
135 Vegetables
136 Vitamins
137. Vulture
138 Washing
139. Water
140 Water cycle
141 Water vapour
142 Waking
143 Warmer
144 Washing
145. Weather
146 Winter
147 Wind
148 Work
149 Wrist
150 Woollen
151. Waste matter
152 Well water

ANNEXURE II

(A) Pre-test 1 Time 30 Mts
Class III Std English Marks: 25

I *Round off the correct spelling*

e g	table	teble	teable	tabal
1.	piti	peti	pyti	pity
2.	fite	fight	fitte	fyte
3.	prowd	prode	proud	praud
4.	mix	miks	myx	musk
5.	stedy	steady	stady	stiddy

5 marks

II *Tick off the correct word*

e g you climp on this————— (stair, stare)
1 Sleeping place in a train————— (birth, berth)
2. You can cook and eat this————— (serial, cereal)
3. This gives a nice small ————— (scent, cent)
4. This is another name for a bird————— (foul, fowl)
5 This is the name of an animal ————— (bear, bare) 5 marks

III. *Complete these words that end with -ish*

e g. Spanish (coming form Spain)
1. —————ish (to disappear)
2. —————ish (silly, stupid)
3. —————ish (language you are using now)
4 —————ish (too make it shine by rubbing)
5. —————ish (opposite of start) 5 marks

IV *Match the following pieces of sentences taking them from Box B*

A	B
e.g. This ribbon is too long. *I want a short one*	This sofa is soft
1 This is an old story. —————	I want a *short* one.
2 Your shirt is wet. —————	be kind to them.
3. A king is very rich. —————	put on a dry one.
4. Don't be cruel to animals —————	tell me a new one
5. This chair is very hard —————	the beggar is poor

V. *Complete these sentences using the words given.*

1. The policeman ————— the thief and caught him.
2 The fire ————— many huts
3 I ————— the keys and gave them to the teacher.
4 The thirsty old man ————— some water

5 We closed the windows to ———— the noise from outside
burned down
asked for
ran after
shut off
picked up

5 marks

Total Score 25 marks

ANNEXURE II

(B) Pre-test 1
Time 45 Minutes EVS-2 Max Marks 25

I *Fill in the blanks with the right words from those given in the list below* 5 marks
(raw, food-items, hard, man made, germs, energy, soft)
e g *Germs* cause disease
1 River is a natural thing but table is a ——— thing.
2. Iron is ———— but sponge is ————.
3 Rice and vegetables are our ————.
4 ———— is the capacity to do work
5 Food that is not cooked is called ——— food

II. *Using the "same word" fill up both blanks of each itmes* 3 marks
e g (a) All answer written in my test are *right*.
(b) When I face towards the rising sun, my *right* hand points to the south
1. (a) Two ——— are needed to fix a blackboard
(b) ———— form part of our fingers
2 (a) We live in Karnataka ————
(b) Air is in gaseous ————
3. (a) ——— is needed to fix a stamp on an envelope.
(b) A decayed tooth gets loose from the ———

III *Cross out the wrong word/words given in brackets* 5 marks
e g We use a scale to measure (length/time)
1 Birds use (feathers/beak) to collect materials for their nests
2. Animals and plants (reproduce/do not reproduce) their own kind
3. Clothes dry quickly in summer because of (evaporation/condensation)
4. Water droplets (float/sink) in air
5. A frog (chews/swallows) its food

IV. *Write down the correct spelling for* 5 marks
e g seosun season
1. nachural
2 argun
3. sabstans
4. feachur
5 privension

V. *Write the following in correct sequence by writing numbers 1, 2, 3 and 4* 2 Marks

e.g eating breakfast, waking
(4) (1)
bathing brushing teeth
(3) (2)

1. cooking, peeling, cutting, washing
2. water, rain, cloud, water vapour

VI *Fill in the blanks choosing right words from those given below.*

(form, heat, ice, water vapour, cool, liquid, states, melts, steam, boils)

Matter can exists in differnt ——1——

Water is a ——2——. Water in the solid ——3—— is ——4—— In the gaseous form, it is ——5—— or steam. If you ——6—— ice, it ——7—— to form water. On heating for some more time, it ——8——, producing ——9——. If you ——10——steam, you get water again

ANNEXURE III

(A)	Post-test 1	Time: 45 Mts
Class: III Std	*English*	Marks 25

I. *Round off the correct spelling* 5 marks

e g. stad	steady	stedy	stddy
1. keep	keap	kepe	kipe
2. borro	borrow	boroow	barow
3. screem	skream	scriem	scream
4. guest	gest	juest	jeast
5 trine	train	trein	trean

II. *Tick off the correct word* 5 marks

e g. to cut into small pieces ————	great, grate
1. You use this to open the lock————	quey, key
2 To pull something up ————	haul, hall
3 You read this to learn ————	lesson, lesser.
4 This is the name of a fruit ————	pair, pear
5. To rule over a kingdom ————	reign, rein

III. *Complete these words that end with -ish.* 5 marks

e g English	(language you are using now)
1 ————ish	(coming from Britain)
2 ————ish	(to print out a book)
3 ————ish	(the waster matter you throw)
4 ————ish	(acting like a child)
5. ————ish	(your body is very hot, you have to see a doctor)

IV *Match the following pieces of sentences choosing them from Box B* 5 marks

A	B
e g He is a weak boy, his brother is strong	that bridge is *wide*
1 She is young, ————————	the dog is *awake*
2 The ice cream is cold, ————————	your house is *very far*
3 Everyone is asleep, ————————	the coffee is *hot*
4 This bridge is narrow, ————————	his brother is *strong*
5 My house is very near, ————————	her mother is *old*

V *Complete these sentences using the words given.* 5 marks

1 Many rich people gave money to ———————— this hospital
2 The doctors ———————— the patients well
3 The nurses ———————— the wards regularly
4 They ———————— patients with their smile and service
5 I want to ———————— such people

look after cheer up
work with
set up move around

Total Score. 25 marks

ANNEXURE III

(B) Post-test 1
Time 45 Minutes EVS-2 Max Marks: 25

I *Fill in the blanks with the right words from those given in the list below* 5 marks
• (seasonal, exercise, vitamins, areas, non-living, shape)

e.g Mango is a *seasonal* fruit
1. ———————— things do not breathe.
2 Air has no ———————— of its own
3. ———————— are lost by washing vegetables after they are cut
4 Different ———————— on the tongue help to taste different things
5. Regular ———————— keeps our body fit and healthy

II *Make meaningful words from the following.* 5 marks

e g eeezrf	freeze
1 Klub	
2 óloc	
3 keab	
4 teteh	
5, mets	

III *Using the same word fill up both blanks of each item.* 3 marks

e g (a) This ia a 100-rupee *note.*
(b) *Note* down the time table

1 (a) We wash and -------------- our uniforms regularly.
(b) ---------------- is a metal
2 (a) If you -------------------- a mirror, it breaks
(b) A water ------------------- is round in shape
3 (a) You can --------------------- in an aeroplane
(b) A ----------------- is an insect.

IV *Cross out the wrong word given in the brackets.* 5 marks

e.g. Evaporation can be speeded up by (heating/cooling) the liquid

1. A butterfly sucks (liquid/solid) food from the flowers
2. Birds build their nests at the beginning of (breeding/rainy) season.)
3. Wax is (soluble/insoluble) in water.
4. A layer of (water/air) sorrounding the earth is called atmosphere
5. Materials dissolve easily in a liquid when they are (crushed/ in lumps)

V *Round off the items that does not belong to the gorup* 2 marks

e g eyes, ears, legs, tongue, nose

1. ice, water, water vapour, air, steam
2. Sparrow, pigeon, fish, culture, owl

VI *Complete the blanks with the words given in the list* 5 marks

The sky remains ---------1--------- and ---------2--------- during summer Days are ---------3--------- in summer Later on the sky becomes ---------4--------- Clouds lead to ---------5--------- The ---------6---------, ---------7--------- begins at this stage Cloudy sky becomes clear The ---------8--------- starts. Days are ---------9--------- in winter. ---------10--------- comes after winter.

(sunny, rain, bright, warmer, monsoon, winter, season, cooler, summer, cloudy)

Effect of Competency-based Activity-centred Approach to Teaching on Attainment of Mastery Level Learning in Environmental Studies

J.S. Padhi

The study has examined the effect of Competency-based Activity-centred Approach (CBACA) on attainment of MLLs in EVS It has also compared the effects of CBACA and traditional approaches (TA) on achievement in EVS

The study has employed intact classes as experimental and control groups and rotated the groups during experimentation 658 grade I children of two equally divided intact sessions of Bhubaneswar DM School, constituted the sample of the study Two competency-based, criterion referenced tests (diagnostic type, with parallel form, covering the contents of units 1 and 2, were developed.

Results indicate that CBACA approach for environmental studies was more effective than the traditional approach. In order to attain the specific competencies, pupils needed to be active and not passive participations in learning. This approach provides plenty of opportunity for thinking, reasoning and looking at EVS in its totality as a highly rational and intellectual problem solving human activity Field trips and out door projects help in experiencing the environment Seeing, feeling, smelling, hearing and touching are most enjoyable and instructive ways to learn. Students need to be engaged in purposeful activities which help in further learning

INTRODUCTION

The most important and far-reaching recommendations of the NPE has been regarding the standard of learning to be achieved by children in school. It emphatically declares Minimum Levels of Learning should be laid down for each stage and subject of education at the primary stage

Since every curriculum intends various domains of development of the learner, lays down specific educational objectives and the corresponding learning outcomes expected on the part of the learners (NCERT, 1991)

RATIONALE

For many years, there has been a growing concern that the level of primary education is deteriorating continuously Children are not reaching the expected learning outcomes in their knowledge, understanding and personality One of the pertinent causes lies with the methods of instruction particularly at the primary stage which are defective, unsuitable for the mental and psychological conditions of the learners In the context of ensuring quality and equity of education, there is need to lay down Minimum Levels of Learning (MLL) in terms of terminal competencies (NCERT 1995).

In the MLL approach, the achievement is defined in terms of mastering competencies. Every child should have attained/mastered the specified competencies by the end of each grade. It encourages specific changes in the teaching-learning process by making them competency-based activity-centred and enjoyable It includes continuous and comprehensive evaluation for raising the performance level of mastery.

Review of related research studies revealed that recently a few studies have been conducted on teaching-learning approaches to EVS with less generalisable results. There has been a neglect of research in this area in our country. Regarding the effectiveness of competency-based education, some American studies (Corcoran 1985; Hess 1986; Moore 1990) suggested its positive effect on students' performacne. The present study was undertaken to examine the effects of such programme in Indian socio-cultural context and within the existing parameters in the school

OBJECTIVES AND HYPOTHESES

1. To study the Effect of Competency-based Activity-centred Approach (CBACA) on attainment of MLC in Environmental Studies (EVS).
2. To compare the effect of CBACA and Traditional Approach (TA) on Achievement in EVS.

On the basis of the above objectives the following hypotheses were formulated:

- (i) Grade 1 children taught through CBACA will produce significantly more "Masters" in EVS, as compared to the TA
- (ii) Grade 1 children taught through CBACA will obtain significantly higher mean achievement score in EVS than TA.

DESIGN

Since randon assignment of subjects to experimental and control groups was not possible, the counterbalanced design was used The design used intact classes as experimental and control group and rotated the groups during the experimentation CBACA was the independent variable and attainment of Minimum Learning Competency (MLC)/achievement score in EVS was the dependent variable.

Sixty-eight grade 1 children of two equally divided intact sections of Demonstration Multipurpose School, under Regional Institute of Education, Bhubaneswar constituted the sample of the study The children were admitted on the basis of computerised randomisation out of 1100 applicants No merit or preschool education was considered for admission Most of the admitted students belonged to average and high socio-economic background and parental education

INSTRUMENTATION

Two competency-based criterion referenced tests (diagnostic type) with parallel form covering the contents of unit 1 and unit 2 were developed by the investigator, and were used after completion of each unit

PROCEDURE

At the beginning of the academic session, the teachers teaching EVS in grade 1 were trained elaborately with regard to CBACA through demonstration. The investigator chose two sections of grade 1 (group 1 and group 2) and two units (unit 1 and unit 2) of EVS equivalent in the complexity and difficulty of the concepts involved. During first replication of experiment, group 1 was taught unit 1 by CBACA and group 2 by TA. At the end of instruction, the CRT on unit 1 was administered to both the groups. Those children who were found to be "non-masters" the criterion-level in group 1, were given suitable remedial measures according to their need and then retested with a parallel form. Group 2 non-masters were not given any remedial measure Then during the second replication group 1 was taught unit 2 by TA, and group 2 by CBACA Similarly, CRT on unit 2 was administered to both the groups at the end of the instruction. Remedial measures were given to the non-masters of group 2 and retested by a parallel form

The sum of the scores of both the groups of the two exposures were compared The significant difference between them can not be interpreted as the product of the initial difference between the two groups, nor can the difference be interpreted as the product of the difference between order of testing.

RESULTS AND DISCUSSION

(1) Effect of CBACA on Attainment of MLC in Unit 1 and 2

TABLE 1
CR in Respect of Percentage in Experimental Group and Control Group Attained MLC in Unit 1

Unit 1 Our body and its cleanliness competencies		*Control Group (%)*		*Expt Group (%) First Attempt*		*After Remedial Measure*		CR
		Masters	*Non-masters*	*Masters*	*Non-Masters*	*Masters*	*Non-Masters*	
1	Identifies the main parts of the body.	87 0	18 0	93 5	6.5	93 5+3 =96 5	3 5	5.35**
2	Understands the importance of keeping them clean.	64 4	35 6	84.2	16 0	84 2+6 2 =90.4	9 8	10 24**
3	Recognises the need of cloths and seasonal variation in them	69 7	30.3	87 8	12 2	87.8+6 5 =94 3	5 7	9 41**
4	Practises personal cleanliness including toilet habits	68 2	31 8	73 4	26.6	73 4+10 =83 4	16 6	10.46**

** $p < 0.01$

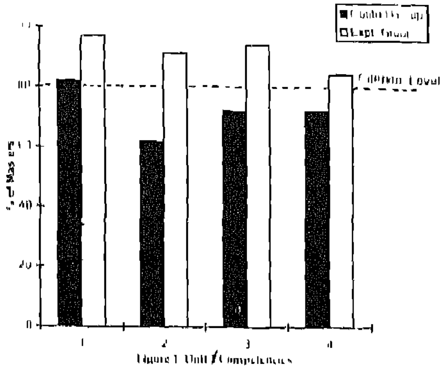

Figure 1. Unit 1 Competencies

The results of Table 1 and Figure 1 shows that the control groups has attained mastery level (82 per cent) in competency 1 and other per cents are below the minimum (80 per cent) It may be mentioned that mastery level of a competency is fixed at 80 per cent marks obtained by a child as well as by a group In the experimental group MLC has been attained by more than 80 per cent children in all the four competencies Those who were found non-masters in the experimental group were subjected to diagnosis for their weaknesses After individual remediation, they were retested with a parallel form In this way, numbers of masters were increased in each competency Then difference between the groups, when compared, found that all the four CRs are significant at 0 01 level in favour of the experimental group On the basis of these results, children taught through CBACA will have significantly higher per cent of Masters in unit 1 as compared to TA.

Similarly, by the rotation group design, unit 2 was taught and post-tested as mentioned. The results of attainment of MLC is tabulated in Table 2 and shown in Figure 2

TABLE 2

CR in Respect of Percentages in Experimental Group and Control Group Attained MLC in Unit 2

Unit 2 Our locality competencies	*Control Group (%)*		*Experimental Group (%)*				CR
			First Attempt		*After Remedial Measure*		
	Masters	*Non-Masters*	*Masters*	*Non-Mastesr*	*Masters*	*Non-Masters*	
1. Identifies some import and local land features e g river, pond, ridge, Knoll, etc	74 4	25.6	84 4	15.6	84 4 + 8 2 = 92 6	7 4	9 1**
2 Recognises some common animals, birds and insects	85 3	14 7	92 8	7 2	92 8 + 3 4 = 96 2	3 8	7 09**
3 Estimates distances in the locality in terms of very near, near, far, beyond and before	79 1	21 9	83 5	16 5	83 5 + 4 3 = 87 8	12 2	9 12**

** P < 0 01

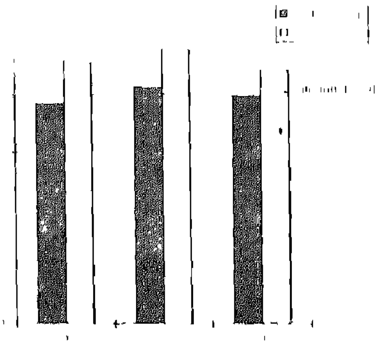

Figure 2. Unit 2 Competencies

Table 2 reveals that control group children have attained NLC in competency 2 (85.3 per cent) and not in other two competencies While the experimental group children have attained MLC in all the three competencies even before giving remedial treatment Moreover, considerable amount of non-masters turned masters through remedial measures in experimental group. The difference between the groups, when compared found that all CRs are significant at 0.01 level in favour of the experimental group From this, it can be inferred that CBACA is found to be more effective than the TA for producing masters in unit 2 Hence the hypothesis mentioned is retained.

(2) Comparison of CBACA and TA for Achievement in EVS

In order to study overall effect of the approaches on achievement, scores obtained in both the units of both groups under different approaches were tabulated and their mean, SD were calculated and summarised in Table 3

TABLE 3
Comparison of Achievement Scores in EVS
Taught Through Different Approaches

Replication	*Mean Achievement Score*				
	CBACA		*TA*		
Unit 1	Group 1	22 82	Group 2	17 62	
Unit 2	Group 2	21 48	Group 1	18 02	
Column Mean		22.15		17 82	
	SD	6 21		5 45	3 07**
	N	34		34	

* p < 0.01

Table 3 shows that the "t" is significant at 0 01 level This infers that CBACA can produce higher achievement scores in EVS than TA On the basis of above results, the hypothesis was retained. The results of the above tables support the findings of the studies conducted elsewhere

CONCLUSION

In the light of the above mentioned findings, we conclude that competency-based activity-centred approach for Environmental Studies is more effective than the traditional approach for grade 1 children In order to attain the specified competencies, pupils have to be active, not passive participants in learning In order to accept activity-centred teaching, learning outcomes and structures teaching steps are to be formulated to facilitate the sequential development of the concepts Motivational questions, answer-clues for some questions are to be given Media and materials required for the activity are also to be suggested Activity-centred teaching makes EVS more interesting, motivative, effective and meaningful. This provides plenty of opportunity for thinking, reasoning and looking EVS in its totality as a highly rational, intellectual problem-solving human activity This would help in developing qualities like self-confidence, curiosity, intiative, inventiveness, self-reliance, persistence and skills of innovation to solve problems in real life situations Field trips, out-door projects as out of classroom activities should be arranged to give opportunities to students to experience the environment Seeing, feeling, smelling, hearing and touching are most enjoyable and instructive ways to learn. Students may be engaged in purposeful activities like simple chart making, simple model making, and collection from magazines and papers which may serve a sensible purpose for further learning.

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Lessons from Teaching "Shadow and Eclipses" in a Primary School

A.B. Sexena

To know the difficulties faced by a teacher and to get first hand experiences to visualise the methods that could be employed for effective teaching in the classrooms, the present study was planned on a topic shadow and eclipses

The study included planning the teaching of the curriculum unit in view of MLLs, available resources, and to improve the learning by students. The curriculum planning was mainly effected by students characteristics, the available resources in the school and the demands of the concepts. Further, the efficacy of teaching was tested, using a questionnaire, containing five multi-choice type tests items. The results were analysed and discussed keeping in view students achievement, MLLs and teacher's role in teaching.

The study shows that incorporation of demonstrations and improving students participation in classroom activities were effective and resulted in achievement of 60 per cent or more score by 58 per cent students.

INTRODUCTION

For a teacher teaching in a primary school, curriculum planning and its transaction are two important tasks It is so because success of his teaching largely depends upon these two factors This paper presents the feedback gained by the author as a result of planning the teaching of the chapter "shadow and eclipses" and its teaching in a primary school. The results of the study have bearing on minimum levels of learning (MLLs), teacher's training and teaching in the classroom.

THE CONTEXT OF THE STUDY

The study was conducted in a state government owned primary school of Bhopal city The school was chosen on the basis of its availability and convenience of approach All the students present in the standard V formed the sample for the purpose of the study The students in this school come from lower class of the society and the facilities available in the school are minimal

The plan of study included planning the teaching of a curricular unit in view of MLLs, available resources and to improve the learning by the students The unit taken for the purpose of study was "shadow and eclipses" This unit was not especially chosen for this purpose, but was scheduled to be taught at the time of study being undertaken The number of students that were present through out the study was 63 It consisted of 32 boys and 31 girls The efficacy of the teaching was tested on the basis of responses given by the students on a questionnaire consisting of five multiple choice type test items.

FACTORS AFFECTING THE CURRICULUM PLANNING

(i) *Learner's chacteristics* Most of the sutdents were around 10 years of age. This is concrete operational stage and at this stage it is not possible for the children to isolate variables and conduct an operation Making use of concrete objects to understand a concept could be helpful. Abstract thinking is not possible at this stage.

As mentioned earlier, the sample consisted of students coming from lower class of the society Their experiences were limited, but it appeared from the interaction that most of the students were eager to learn and quick to respond to the teacher's initiative

(ii) *Philosophy of the curriculum·* Environmental approach to teaching have been found to be useful and affective in many cases (e g , Saxena et al 1985) The assimilation of the following components in the curriculum amounts to using enviornmental approach (Saxena 1986)

(a) Developing positive attitude toward environment,
(b) Relating the concepts with local environment and resources,
(c) Attempting to develop empathetic relationship with different members of the community and understanding their role and importance;
(d) Making use of easily available material from local environment for conducting experiment, demonstration, discussion, etc.

These components are made use of in the development of curriculum according to the need of the concepts being dealt with For example, to teach "shadow and eclipse" components (a) and (d) are more relevant than the others

(iii) *Demands of the concepts involed·* The unit "shadow and eclipses" consists of the following concepts

(1) Transparent, translucent and opaque materials,

(2) Shadow and its following characteristics
   (a) Shape of the shadow depends upon the shape of the object
   (b) No light enters in the region of shadow
   (c) Size of the shadow depends upon the distance of the object from the source and from the screen.

(3) Solar and lunar eclipses.

(4) The size of the shadow in the sunlight changes with position of the sun in the sky; sun dial.

These concepts are mostly new to the students except 2 (a) Therefore, some kind of demonstration/activity involving stsudents participation is necessary for better understanding of the concepts For better planning, the activities could be depicted using Gowin's Vee. For example, activities pertaining to concept (2) mentioned earlier could be described on Gowin's Vee as shown in Figure 1.

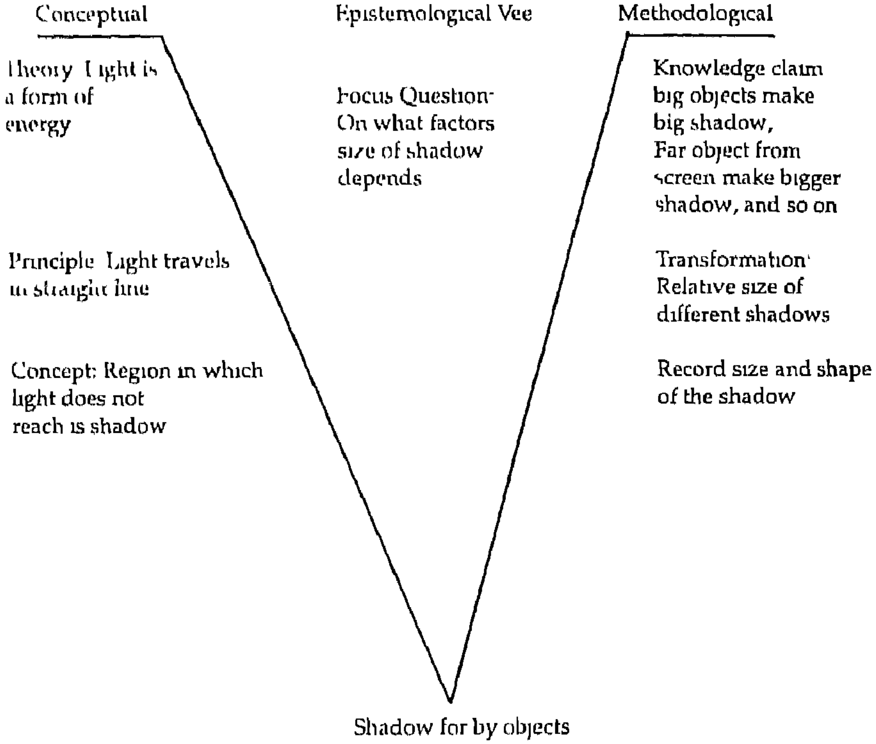

Conceptual
Epistemological Vee
Methodological
Theory Light is a form of energy
Focus Question: On what factors size of shadow depends
Knowledge claim big objects make big shadow, Far object from screen make bigger shadow, and so on
Principle Light travels in straight line
Transformation: Relative size of different shadows
Concept: Region in which light does not reach is shadow
Record size and shape of the shadow
Shadow for by objects

Figure 1 Depiction of activities on Gowin's Vee

The MLLs related to these concepts at primary level are (MHRD 1991)

Class III	*Class IV*	*Class V*
10 3 1 Earth-sun relation and consequences	10 4 1 Heavenly bodies	10 5 1 Appreciates the importance of science in our daily life
10 3 2 Describes the shape of the earth	10 4 3 Knows difference between sun, earth and moon	
10 3 3 Relates occurrence of day and night to the rotation of the earth	10 4 3 Recognises pole star and Great Bear (Saptrishi) and uses them for finding direction at night	
10 3 4 Observes difference in the duration of day-night over the year	10 4 4 Observes phases of the moon	
10 3 5 Generalises about the occurrence of seasons		
10 3 6 Observes consequences of the occurrence of seasons (some situations)		

The revised version of MLLs provides the following in this context (NCERT, year not mentioned)

Class III	*Class IV*	*Class V*
3.3.13 Recognises the importance of the sun for the life on earth	3 4 14 States that the sape of the earth is round	
	3 4 15 Compares and records pictorially the shape of the lighted portion of the moon on different nights	
		3 5 11 Infers that apparent movement of the sun from east to west is an indicator of the rotation of the earth from west to east
	3 4 17 Sees relationship between occurrence of day and night and the rotation of the earth on its axis	

It could be seen that neither of the MLLs provide any hint for the concepts included in the textbook of Environmental Studies prescribed in the state of Madhya Pradesh (MP Pathya Pustak Nigam 1990) Perhaps the concepts of this unit, mentioned earlier, were considered difficult to be achieved for the majority of the students, by the writers of MLLs

THE TEACHING

To teach the concepts listed earlier, these were analysed in terms of students terminal behaviour and accordingly suitable activities/demonstrations were planned These consisted of mainly the following.

1 Examination of various objects made up of various substances such as paper, plastic, metal, glass, etc, in the sunlight and observation of their characteristics in terms of passing of the light through them, visibility of objects through them and formation of clear shadow; classification of material on the basis of these characteristics into transparent, translucent and opaque material

2 Cutting the cardsheet into different shapes such as bird, tree, etc., observation of their shadow in the sunlight and the size of the shadow by varying the distance from the screen of the source of light (a lighted candle). Drawing conclusion about the factors on which the size of the shadow depends (size of the object, distance of object from the screen and distance of object from the source of light)

3. Using balls of different sizes as model of the earth and the moon, demonstration of model demonstration of solar and lunar eclipses using sunlight

4. Observing that when the shadow of an object falls on the eye, the source of light (sun, flame of the candle, etc) is not visible to the viewer.

5. Drawing line diagram of the formation of shadow due to a point source of light and a regular shaped body

6 Fixing a rod vertical in the sunlight and observation of its shadow, its size and its movement during the period of a day, discussion on its cause and use of this property in making of a sun dial

Such activities were employed to bring home the desired concepts. Students participated, observed and drew their conclusions. If they failed to arrive at the desired conclusion, the teacher helped in the process. Further, the teacher provided the summary of the conclusion drawn by the students. In this way all the concepts were covered Activity 6 related to variation of the size of the shadow of the rod in the sunlight was conducted by the students at home on Sunday. Total teaching time in the school was about 3 hours

EVALUATION

To test the efficacy of the teaching a questionnaire containing five multiple-choice type questions was administered The questionnaire is given in Appendix 1 While administering the questionnaire the students were explained what is expected of them However, no hint was given of the correct response This explanation was necessary to be given because students were unfamiliar with responding to the questionnaire The process was new to them

ANALYSIS OF RESPONSES

Students responses were analysed in terms of right or wrong Each correct response was given the score of 1. In Q 2, unless mark was put on both the correct objects, zero score was given Failure to put any marks was considered as wrong response and earned zero score In this way percentage of correct responses for each question was calculated which came out as following

Question	*Percentage of correct response*
Q 1	48
Q 2	59
Q 3	60
Q. 4	46
Q. 5	54
All the questions	53

The percentage of students with various scores was as follows:

Score	*Percentage of students*
0-20%	3%
1-20%	16%
2-40%	24%
3-60%	24%
4-80%	24%
5-100%	10%

Thus, 58 per cent students scored 60 per cent or more, which was considered to be encouraging, particularly looking to the school conditions, time devoted to teaching and other factors

DISCUSSION

As a result of planned teaching which included some demonstrations and students' activity, it resulted into the achievement that have been described earlier It is felt that students' achievement could be further improved upon by converting more demonstrations into students' activities. It is possible within the available resources because none of the demonstrations that were conducted required expensive equipments/materials These could be easily procured by the teacher and the students However, it must be conceded that in case more student participatory activities are conducted, the teaching of the same concepts would take more time and the students would make much more noise Unfortunately, most of the teachers teaching in the schools are not tolerant to the noise that occurs as a result of students' participation in the activities It must be realised that it is worth the gains that are made by investing some more time and the extra effort required on the part of the teacher.

Another important point that arises is about improving the achievement of those students who could not do satisfactorily well so far What strategy should be adopted by the teacher so that all the students are able to achieve 80 per cent or more (or any other standard set by the teacher)? Naturally, the answer lies in making another attempt to improve the learning of students who did not make satisfactory progress The difficulty is that it would require differential teaching. It is suggested that the teacher teaches the entire class the same concept at a slightly higher plane after summarising what has been done earlier This would serve two purposes. (i) reinforcement of the concept to those who have already achieved satisfactory level, and (ii) improvement in learning of the under-achievers. For example, in the case of concepts transparent, translucent and opaque material, the teacher could demonstrate that piling up of a large number of translucent sheets results into making up of almost opaque material. Therefore, drawing clear cut boundary between opaque and translucent material is some times difficult.

Finally, the achievements normally obtained by the students should be used to decide MLLs that are achievable. The document that describes and lists MLLs (MHRD 1991, NCERT year not mentioned) do not describe in detail the procedure and criteria that was adopted to device the MLLs, except consultation with the teachers in the workshop mode. There is tendency to limit the teaching in the classroom to the MLLs because no document states what more is achievable or may be attempted to achieve. In this sense, for most of the teachers and schools, Minimum Levels of Learning are turning out to be maximum levels of learning and teaching thereby making majority of the children to under-achieve and not harnessing the capability of the students to the maximum. Perhaps there is a need to have another look at MLLs and the purpose that they are intended to serve. The capability of the students studying in schools at various stages must be field tested and this should decide and validate MLLs. Inclusion of higher level concepts achievable by majority of students would encourage bright students to learn "extra" and satisfy their mental need.

ACKNOWLEDGEMENT

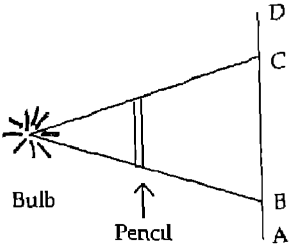
The author acknowledges with thanks the help provided by Prof S N Tripathi and for the fruitful discussions with him The cooperation and help given by the school teachers is also acknowledged

Appendix 1
Translated Version of the Questionnaire

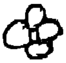
Instruction· Put mark (✓) on correct answer

Q. 1 In the figure the formation of shadow of a pencil on a wall by the bulbs is shown Which
part of the wall shows the shadow?

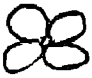
(a) AB (b) AC (c) BC (d) CD

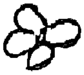


Q 2 The shadow of a flower formed on four walls is showns Mark the shadow which is formed on the farthest wall?


(a)

(b)


(c)


(d)

Q 3 Which objects are made up of transparent material?

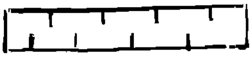
Plastic scale

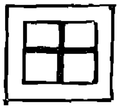
Iron nail

Book

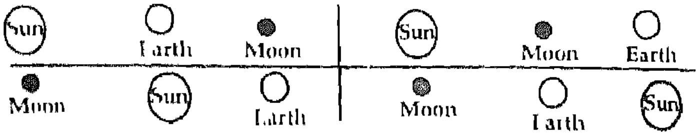
Window glass

Chair





Q. 4 In which case solar eclipse could take place?



Q. 5 We are standing in the shadow of the tree. Our eye is in the shadow. We shall

(a) be able to see sun completely

(b) be able to see sun partially

(c) not be able to see the sun

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Teaching of Force, Work and Energy at the Lower Primary Level

V.G. Jadhao and B.K. Parida

The objectives of the study were. (a) to study the distribution of physics concepts of force, work and energy and related ideas in the Environmental Studies curriculum at the lower primary level, (b) to suggest their redistribution with reference to proper development of physics concepts in the child in the long-run, and (c) to suggest transactional strategies to avoid and prevent formation of misconcepts or alternative frameworks in the child in relation to the concepts of force, work and energy.

The methodology consisted of analysis and review of placement and contents of the concepts of force, work and energy in the NCERT textbooks. Already existing treatment of these concepts was also subjected to critical scrutiny so as to avoid formation of misconcepts as well as to match the Piagetian development stage of the child.

The results showed that the placement and distribution of the concepts of force, work and energy in the textbooks are, as a rule, included in separate chapters, which can be easily recognised as belonging to the discipline of physics Secondly, their sequence is not uniform across the classes III, IV and V Moreover, the sequence in class V matches exactly that which is followed in teaching physics as a separate discipline in higher classes It is further discovered that, in the teaching of these concepts as delineated in the textbooks, children are likely to develop misconceptions/alternative frameworks which may act as hindrance to the right appreciation of the concepts now and in future. A redistribution of the concepts and alternative transactional strategies are suggested

The alternative transactional strategies suggested in the study need to be tried out to make the teaching of physics concepts easier and more interesting

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INTRODUCTION

In formal science in general, and in physics in particular, the concepts of force, work and energy play a very important role as these are known to govern the physical processes of nature, and without their help we cannot study our environment (Lewis 1972) Every child seems to be familiar with these ideas and their applications in some way or the other, to some degree or the other in his/her everyday life and in the surroundings It is difficult to develop the right kind of scientific knowledge base involving these concepts in the minds of the pupils in the early years of schooling considering the degree of abstractness associated with these concepts and their formal definitions. It becomes all the more difficult when these concepts need to be integrated with other topics of science/environment as emphasised by the National Policy on Education 1986 and envisioned in the National Curriculum for Primary and Secondary Education (NCERT 1985; NCERT 1988) The National Curriculum Framework (NCERT 1985) emphasises, under the heading, The Scientific Temper, that " .. It is important to keep in mind that in the teaching of science and the social sciences, we should be aware of the complexity of man and his environment which cannot be understood from the point of view of a single scientific discipline An inter-disciplinary approach, therefore, is more conducive in broad-based education," and stipulates that "At the primary stage, the (science) curriculum transcation should follow an integrated approach." This is in consonance with the view of UNESCO (1980) on the subject Based on the suggestions of the National Curriculum Framework 1988 and the National Policy on Education 1986, syllabi have been framed and textbooks written for the various classes in our school system. We feel that whereas the integrated science approach (Lewis 1972; UNESCO 1980) may well help a large fraction of pupils become scientifically conscious citizens of the future, losing sight of the disciplinary approach to teaching of science (King and Brownell 1966; UNESCO 1980; Paul 1990) is likely to harm those pupils who would later on want to specialise in the various disciplines of science We must not forget that specialists are the generators of knowledge without which science cannot grow and we cannot perceive the subtleties of nature. It may thus pay to strike a balance between the integrated approach and the disciplinary approach to science even at the primary level.

On the recommendation of the National Curriculum Framework (NCERT 1988), science is taught as part of environmental studies under the subject head "Environmental Studies—Science" at the lower primary stage (class I to class V), and it is taught under the subject head "Science" at the upper primary stage (class VI to class VIII). At the secondary stage (class IX to class X), science is again taught under the subject head "Science." The concepts of force, work and energy and the related ideas have been given a place of significance in the environmental studies/science curricula of various classes mentioned above Keeping in mind the present thrust on the primary education in India in the form of District Primary Education

Programme (DPEP) (Department of Education 1995) aiming at Education for All (EFA) and qualitative improvement in the overall teaching-learning scenario, we propose here to analyse, at some length, the pros and cons of teaching of the concepts of force, work and energy at the primary stage (class I to class V) After discussing the various aspects of the situation we came out with suggestions which would enable the teachers as well as pupils to appreciate the concepts of force, work and energy better For this purpose we look at the corresponding textbooks published by the National Council of Educational Research and Training (NCERT) as these books are widely followed in the country

There are no prescribed textbooks on environmental studies for classes I and II We shall therefore consider the textbooks on environmental studies (science) for classes III to V The first thing we note is that in these textbooks the various science topics formally belonging to disciplines like physics, chemistry and life sciences have been described in separate chapters/units which can be recognised as such on the first perusal of the books The disciplines, of course, have not been mentioned explicitly in the books Thus the real integration of science topics is not that apparent at the first glance. Here, we shall concentrate on force, work, energy and related concepts as presented in these textbooks on environmental studies—Science (class III to class V)

FORCE, WORK, ENERGY AND RELATED CONCEPTS IN THE LOWER PRIMARY CURRICULUM

Figure 1 depicts how force, work, energy and related concepts are distributed over the various classes in the NCERT textbooks. The concerned chapter heads are also given in the figure for ready visualisation We note that the class III textbook (NCERT 1993) does not deal with the topics of force, work and energy concerning the discipline of physics under a separate chapter head. However there is indirect reference to the concepts of energy and work in chapter "Our Food" which formally belongs to the discipline of Biology

We shall now give a class-wise and chapter-wise analysis of the relevant topics.

CLASS III (NCERT 1993)

CHAPTER 5. OUR FOOD

This chapter when viewed through the disciplinary glasses obviously belongs to the discipline of biology It refers to the concept of energy as something we get by eating food. The concept of energy is very nicely presented here but for the following two statements which could have been avoide

(i) "Food gives us capacity to do work " This is immediately followed by.

(ii) "This capacity to do work is called energy "

·We say this because these relate to the formal definitions of the terms work and energy and the child is not ready to receive these at this stage

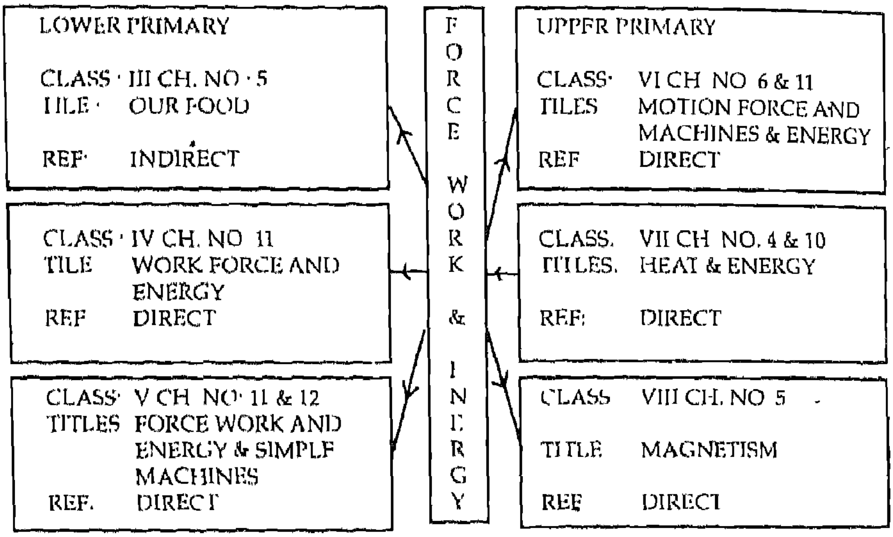

Figure 1

·CLASS IV (NCERT 1993a)

CHAPTER 11: WORK, FORCE AND ENERGY

The chapter starts with the assertion that all human beings, animals as well as machines do work It is stated that force is an essential thing in the situation where work is done, Then the concept of force is introduced as "push" and "pull', Kinds of energy as well as sources of energy have been given importance The concept of energy is introduced in a sudden fashion directly with the example of steam engine. Fuel is stated as something which produces heat energy by burning. Different forms of energy are introduced through everyday examples of their inter-conversion.

CLASS V (NCERT 1993b)

CHAPTER 11: FORCE, WORK AND ENERGY

This is a purely physics topic and represents the existing lacuna in the environmental studies approach In this chapter, only the examples are taken from the environment but the the conceptual arrangement/sequence matches that of the physics discipline The disciplinary approach then is in no way different because it never debars the teacher from giving examples from the environment. Here, the concept of force is introduced as some push or pull essential for movement of objects around us This may create the wrong notion that no motion is possible in a force-free situation. Another example which may also lead to wrong notions about force is the statement "When an object is dropped it falls What makes it fall? It is the force within the earth which pulls it down . When you throw a stone up it comes down because of the *force of gravity* "(emphasis added) In this case, the wrong notion that may develop is that the gravitational force due to earth acts on downward moving objects only, and, also that the force "resides" (Watts 1983) in the earth. The correct concept is that the gravitational force expresses the interaction between the earth and the stone, and it acts always downwards, both when the stone is going up as well as when it is coming down The effects of force have been discussed with examples from everyday life. The concept of frictional force is then introduced as a force that resists the motion of objects by giving the example of pushing a heavy box Examples are also cited highlighting the beneficial and harmful effects of friction in our day-to-day life.

As regards the concept of work, the treatment is nothing but disciplinary. An attempt is made to distinguish between the meaning of the term "work" used in everyday language and that in science It is emphasised that the concept of work comes into play only when force and movement both exist. The possibility that the direction of the force and that of the movement could be different is not discussed While clarifying the difference between the general usage of the term work and its meaning in science, a small but significant error has crept in as under After stating that "A push or pull is called force," it seems somewhat incorrect to state that "All these actions or pulls and pushes which move objects, are called work."

Regarding energy, it is first stated that, "Energy is required to apply force," and, then it is defined as a capacity of the body to do work These concepts of work and energy are then developed further with the help of examples of work-situations and sources of energy in the environment

At the awareness level the chapter explains the utility of certain devices like inclined plane, lever and pulley for doing certain jobs in an easier manner At the conceptual level, it brings home, very effectively, the fact that a piece of work can be made easier by spreading it over a longer distance.

CONTEMPORARY VIEWS ON TEACHING OF FORCE, WORK, ENERGY AND RELATED CONCEPTS

Contemporary research in science education is putting much emphasis on the cognitive bases of learning (see for example Redish 1994 and reference therein) which basically explores the probable mental processes involved in the various stages of learning As a part of this kind of research it has been discovered that pupils, practically at all levels of learning, possess a lot of preconceptions, alternative conceptions and misconceptions in a given domain of learning which often act as an impediment to learning of science (Driver 1981, Driver, Guesne and Tiberghien 1985; McDermott 1991). Some amount of work has been done in areas involving force, work, energy and related concepts in India (Mohapatra and Bhattacharyya 1989, Saxena 1994)and abroad (Driver 1989, Watts 1983, McDermott 1984, Hestenes et al 1992, Solomon 1983; Driver and Warrington1985, Brook and Driver 1984, Archenhold 1982) with many interesting findings To give an example, children as well as adult students possess ideas like "Motion implies force", "No motion therefore no force"and "Moving objects have an internal force acting in the direction of motion." Most of these studies involve pupils at a relatively higher age group (secondary school and beyond) and not much work has been done on pupils at primary level Under the circumstances we may extrapolate the findings of the above mentioned studies and conclude that pupils at elementary level will have much more difficulty in appreciating, scientifically, the concepts like force, work and energy although they are familiar with these terms as they are used in every day life It is therefore worthwhile to find out if the difficulties can be removed/lessened by adopting suitable strategies in the transaction of such topics. Transaction notwithstanding, it is pertinent to question the very inclusion of such abstract topics in the science curriculum at lower primary level In this connection we would like to quote Driver from her article "Piaget and science education. a stage of decision" in the book on primary science (Hodgson and Scanlon, 1985) " Currently there is considerable debate among science educators about aspects of the (Piagetian) theory The most fundamental criticism comes from those who adopt a traditional, learning theory approach which does not hypothesise the existence of internal structures of operations guiding behaviour, but instead interprets behaviour as response to external reinforcements If reinforcement patterns change the behaviour changes More complex behaviours or skills can be built up by careful programmes integrating prior learned behaviours "After this, regarding the selection and ordering of teaching experiences she quotes Ausubel "The most important single factor influencing learning is what the learner already knows Ascertain this and teach him accordingly," and makes the following very interesting observation "It is probable that either developmentalists (Piagetian) or classical learning theorists (Brunerian) would agree with this statement, but the meaning they would each ascribe to it would be significantly different." According to the Brunerian point of view this means that any new idea can be taught to a child of any age provided a carefully sequenced teaching programme of necessary subordinate ideas is used. In view of Piaget's developmental ideas, however, taking into account what the learner already knows would also include the cognitive operations available to him The experiments (Anderson 1968) undertaken to put the two views to test, lend support to the Piaget's developmental proposition.

DISCUSSION AND CONCLUSION

The NCERT textbooks that we have analysed also put emphasis on skills and processes learnt by the pupils through activities rather than the rote learning of certain facts and laws. Of course, the facts, concepts and laws cannot just disappear from the book but their sequencing or just their selection should follow any one of the Brunerian or the Piagetian point of view This aspect has not been properly taken care of There is some kind of haphazardness in elucidating the concepts of force, work and energy in separate chapters or in other related chapters Also the statements about them are too bookish or formal so that the pupils would not immediately understand them at all or they would help create some alternative conceptions which would be very difficult to erase in further schooling.

Our suggestion is that the concept of energy in its own right and not as a derived concept from force and work, need be taught to the child at least upto class IV if not upto class V The terms force and work may either be totally removed or suitably redefined or renamed to match with the pupils experience and the mental stage of development In this sense, the reference to the concept of energy in the chapter "Our Food" (class III) is nicely developed but for the inclusion of the prototype definition of energy. To explain what we mean by it, we would like to quote the opening lines of the same chapter "Look at the picture on this page. You find some people are working, some are playing and some are engaged in some other activities After playing or working for a long time we feel tired When we rest we feel better When we are hungry we also feel tired After eating food we feel better. We all need food Food gives us the capacity to do work The capacity to do work is called energy" In this paragraph, two points are worth noting. Firstly, the term "work" has been used in the ordinary sense and not as force multiplied by distance. The meaning is as understood by any layman and the same thing the child also understands Secondly, the last two sentences try to define the term energy In our opinion, the last two sentences could be replaced by, "Food gives us something that helps us in our daily activities This something that makes us ready and fresh for our daily activities is called energy." Note that in our modified definition the term "work" is avoided

To take another concrete example to demonstrate how the concepts of force and work are suddenly introduced, we quote the opening lines of the chapter entitled work, Force and Energy in the textbook of class IV. "All of us do work Some people work in the fields Some people work in the factories. Not only people, but animals and machines also do work. We apply force in doing work " There are two problems with such a kind of beginning for teaching science concepts at lower primary level. Firstly, these statements are given to establish relationship between two abstract concepts, namely force and work, without involving concrete experiences of the child in any way Secondly, the last statement may help the child to develop an alternative concept that machines do not apply force in doing work After this, some activities in terms of push and pull are given, which are definitely within the concrete experience of the child. However, the direction in which force need be applied to stop a rolling ball, as discussed in the text, might pose a problem for the teacher to demonstrate and the pupils to appreciate The subsequent discussions on work, energy and their interrelations use examples from the environment Here we strongly feel that the use of the term work can be easily avoided. Instead of work we could use the term 'change' stating that any kind of change requires energy. In this connection we would like to quote the strategy for teaching the concept of energy as suggested by McClelland (McClelland 1970) According to him, the overall concept of energy can be conceived as based on the following heirarchy written from high to low level·

conservation of energy
energy as an entity (the ability to cause changes)
class names of forms of energy
class names of properties—moving, elastic, hot, etc
class names of specific objects used in examples

The key concepts to be learnt by the children could be,

"Energy is the ability to make change," and

> "Energy is never lost or destroyed it is changed form one form to another."

Interestingly he goes further and says, "Those with a background in physics may throw up their hands in horror at the absence of any mention of work. In attempting to define energy it is common to take work as the starting point. However, work, in its turn, depends on the very abstract and difficult notion of force "

We find a different approach to the concept of force in class V in the chapter on "Force, Work and Energy." In contrast to class IV where force is related to work, in class V, force is related to motion, again through the terms of push and pull. This is in consonance with the disciplinary approach as pointed out earlier But a conscious curricular decision is required to be taken to the effect that we shall follow a disciplinary approach for teaching the concept of force, work and energy at the level of class V which happens to be the terminal stage of the lower primary education As it stands, at present, things have been left to chance and no definite curricular design is conceived while constructing the physics part of the environmental studies curriculum. This also partly explains the occurrence of the inadvertent conceptual errors. Finally we suggest that physics experts, learning theorists, and teachers put their heads together to come out with a viable environmental studies curriculum involving the concepts of force, work and energy at the lower primary level

Acknowledgement

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Literacy and Numeracy Attainments of Class II Students DPEP States— A Meta Analysis

Ved Prakash and Pranati Panda

The study assesses learners achievement both in language and mathematics, and the influence of certain demographic variables like area, gender and category on the performance of learners in the DPEP states at the beginning of primary cycle The source of data was 37 DPEP districts.Though the selection of the districts across the DPEP states was made on the basis of low female literacy rate and low socio-economic, educational and cultural background, the districts differd in their socio-economic, cultural and educational background and process variables. The data were collected using a simple literacy and numeracy test developed by the NCERT Pooled means and pooled standard deviations were computed on the basis of average performance Data were subjected to "t" test to know the influence of area and gender

The findings revealed a large variation in the mean performance of students across the DPEP states, although in overall, language performance was better than mathematics Area and gender did not influence the mean performance of students in both subjects

The overall situation across and within states at the lower primary stage appears to be very alarming. The findings suggest planning intervention strategies to improve the quality of teaching, allocating best women teachers and physical resources. There is an urgent need to prepare and motivate the teaching community by giving them a satisfying teaching environment, and carry out individualised instructions.

INTRODUCTION

India can take the credit for having the largest primary education network in the world Educational facilities in the sector of primary education have witnessed meteoric growth during the last four decades. The number of Primary schools escalated from 209.7 thousand in 1950-51 to 565.8 thousand in 1991-92. The hike in the number of schools provided impetus to the enrolment at primary level which increased from 13.8 million in 1950-51 to 101 6 million in 1991-92 (Department of Education 1993) But this does not seem to be enough as 56.1 million children are still to enter the portals of primary education. It does convey that we are way below the target of Universalisation of Elementary Education (UEE) which still appears to be a distant dream

Though the breakthrough in making schools available in primary education cannot certainly be belittled, in terms of quality it can hardly boast of any big leap forward. The quantum jump in the number of educational institutions and the number of beneficiaries over the last half-a-century will impress even a casual observer. Though the overall scene appears good on paper, the ground realities are drastically different. The enrolment figures have soared high, undoubtedly, but the "holding" capacity of our primary institutions has not come up to that level Infact the overall drop-out rate which is as high as 69 4 per cent at the upper primary level and 47 9 per cent at lower primary level signifies that all efforts and resources for enrolment are not being put to optimum use. The achievement in enrolment, however, may not be sufficient to compensate for the yawning gap in the standards of education. With high literacy levels comes a greater awareness of what could be achieved but this is not matched by the ability to get it Apart from the decline in standards, non-fulfilment of the constitutional obligations to provide universal primary education to those in the age group 6-14 during the last four and a half decades has put the system in the docks.

DPEP: A CONTEXTUAL APPROACH

The District Primary Education Programme initiated by the MHRD in 1993 is a pioneering approach for achieving the goal of UEE through Education for All by A D. 2000 Planning for UEE had hitherto, been mainly at the national and state level. These units were too heterogeneous for effective planning because they did not provide for contextuality Contextuality entails local area based planning with disaggregated target and decentralised planning and management. Until now the approach was top-heavy and thus failed to produce the desired results. Ideally, the planning should be from grassroot level to the top, in other words from the village upwards However, given the objective conditions, a beginning has to be made with district as the unit of planning. The district plans are to be prepared through an intensive process of interaction with the local bodies, teachers and NGOs so that it is owned by one and all The involvement of the people with such a programme gives them a feeling of commitment Their contribution towards the planning and implementation of such programmes is significant because of their familiarities with ground realities.

The strategies of UEE which, hitherto, emphasised mainly access in terms of construction of class rooms and appointment of teachers needs to be augmented by developing district specific projects with specific activities, clearly defined responsibilities, definite time-schedule and specific targets Each district project will be given an "exclusive" treatment and will be tailored to the specific needs and possibilities in the district.

District Primary Education Programme resorts to a multipronged strategy It adopts an integrated approach towards universal access, universal participation, and universal achievement by reducing the disparities among areas, gender and social groups. In a nutshell, the overall goal of the project would be reconstruction of primary education as a whole in selected districts instead of a piecemeal implementation of schemes

DPEP has been taken up in 46 districts in the states of Assam, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and Tamilnadu As a part of the project formulation process, Baseline Assessment Studies (BAS) were undertaken to provide research based support to the disrtict plans These studies were conducted in the districts having female literacy rate lower than the national average and low socio-economic status. The main thrust of the study was to assess the learning achievement of the students both at the beginning and at the end of the primary school cycle Class II students were assessed for simple literacy and numeracy skills through a test based on the competencies of class I course content in order to study the level of learning achievement at the beginning of the primary schooling A similar exercise was carried out through a test for the terminal stage of primary education which in some states is class IV and in others is class V. The tests used for such a group comprised language and mathematics competencies based on the course contents of class III and class IV respectively.

RESEARCH ON SCHOOL ACHIEVEMENT

The foundation of learning for later school years is laid at the primary level This stage of school education is so crucial that educational researchers all over the world have been concerned about learners' achievement and its determinants. All recent Indian studies have shown low level of achievement among primary school children. In a study by Gogate (1984), it was found that the average performance level of the children in grade V was barely equivalent to the competencies expected to be achieved at the end of grade II.

The study conducted by Dave et al (1988) on primary school children from class I to IV revealed large differences in the levels of achievement across the states Besides, the study also indicated wide variations in the levels of achievement in mathematics and language Significantly the study projected a sudden slump in the achievement level of children in all subjects after two years of primary education. Low levels of achievement at the primary stage were also observed in studies conducted by Govinda and Verghese in Madhya Pradesh and Bashir et al in Uttar Pradesh in the year 1993 Shukla (1994) launched a gigantic study covering a sample of sixty-six thousand primary school students, spread throughout the length and breadth of the country. The study displayed large variations not only between the states but also between gender and amongst categories Jangira (1994) while analysing the results of the baseline assessment study of eight DPEP states observed that the performance of students was abysmally poor both in language and mathematics

It may be inferred from the findings of the aforesaid studies that the overall performance of primary school children has been universally poor across the area, schools, gender, categories and the states Therefore, it is essential to undertake studies which could help identifying variables in a given context which influence learners' achievement Such studies would create an intense impact because they would be local specific and would excavate the ground realities It is, precisely, for these reasons that such studies should be conducted at regular intervals with a view to updating not only the knowledge bank but also to help in planning the corrective measures.

RATIONALE

The baseline assessment studies aimed at assessing learners' achievement both in language and mathematics and related input variables at the beginning and at the end of the primary school cycle Since these studies reflected that the performance of class V students both in language and mathematics was barely equivalent to what one was supposed to achieve at the end of the class II, there seemed to be something drastically wrong in the process which damaged the system at the beginning. This made it all the more necessary to look for the variables that can be used as explanatory variables for the purposes of making predictions for future performance in higher classes

The present study is an attempt to study the influence of some demographic factors on learners' achievement in the selected DPEP districts taking into consideration the average performance of the learners at the beginning of the lower primary stage More specifically, the study takes into account the impact of certain demographic variables like area, gender and categories on the attainments of literacy and numeracy skills at class II stage within the states and also across the states Comparisons in the present investigation have been made by adhering to a pattern of common design, common competencies and common tools Besides other major factors for making comparisons across the DPEP states have been the selection of DPEP districts on the basis of low female literacy rate, low socio-economic status and the selection of only government institutions However, it is pertinent to mention here that these states differ in their socio-economic, cultural, educational background and in the pattern of input and process variables The findings of the present study, therefore, may be viewed with these limitations in mind.

METHODOLOGY

The source of the present study is the data collected under the baseline assessment studies carried out in as many as 37 DPEP districts located in the states of Assam, Orissa, Maharashtra, Tamilnadu, Haryana and Madhya Pradesh The study was primarily based on multi-level sampling design The sample was selected from urban and rural sectors of each district. About 20 per cent of rural blocks and urban areas identified in 1991 Census were randomly selected Wherever a tribal block did not appear in the selected sample, one tribal block was added to the sample Further, 35-45 primary schools were randomly selected from each district on the basis of proportionate allocation considering the rural and urban population Twenty students were selected using the technique of random start from each school The state wise details are shown in Table 1.

TABLE 1
State-wise Sample of Districts, Schools and Class II Students

State	*Districts*	*Schools*	*Number of Class II Students*
Assam	04	161	1981
Orissa	04	165	1704
Maharashtra	03	135	2022
Tamilnadu	03	120	1856
Haryana	04	145	2462
Madhya Pradesh	19	801	8331
Total	37	1527	18356

A simple literacy and numeracy test was administered to class II students based on competencies expected to be acquired by the end of class I. The test was developed by the NCERT as a part of primary education curriculum renewal project. It was in two parts namely the total of literacy and the numeracy The literacy test was essentially reading 10 letters and 10 words The numeracy test comprised number recognition, addition and subtraction The test was administered orally.

The data collected under the Baseline Assessment studies by using the above mentioned tests have been reanalysed for the purposes of present investigation Pooled means and pooled standard deviations were computed on the basis of average performance of students in selected districts State means for each state were separately computed both in language and mathematics for class II students The means were also computed across the states The data were further subjected to "t" test with a view to studying the effect of area, gender and categories on learners' achievement

ANALYSIS AND INTERPRETATION

Tables 2, 3 and 4 depicts the achievement of class II students both in literacy and numeracy within the states and across the states

TABLE 2
Mean Performance of Class II Students in Numeracy and Literacy

States	*Mean Performance and SD*					
	Numeracy			*Literacy*		
	Max. Marks	*M*	*SD*	*Max Marks*	*M*	*SD*
Assam	14	9 70	1 67	20	11 56	3 41
Orissa	14	7 78	2 62	20	12.64	2.77
Maharashtra	14	6 51	2 39	20	9.91	2.63
Tamilnadu	14	4.70	2 10	20	7 48	2.54
Haryana	14	6.69	2 21	20	10 63	3.20
Madhya Pradesh	14	5 84	2 49	20	10.42	3.68

TABLE 3
Interstate Variations in the Performance of Students in Mathematics

	Assam	*Orissa*	*Maharashtra*	*Tamilnadu*	*Haryana*	*Madhya Pradesh*
Assam	—	5 63**	9 22**	8.87**	3 28*	6 71**
Orissa	—	—	8 5**	8 18**	6 64*	3.98*
Maharashtra	—	—	—	6 96**	1.56**	1.92
Tamilnadu	—	—	—	—	3.73*	3 79*
Haryana	—	—	—	—	—	1 89
Madhya Pradesh	—	—	—	—	—	—

*P < 05 **P < 01

TABLE 4
Interstate Variations in the Performance of Students in Language

	Assam	*Orissa*	*Maharashtra*	*Tamilnadu*	*Haryana*	*Madhya Pradesh*
Assam	—	1 79	5 58**	6 13**	1 72	2 49*
Orissa	—	—	1 95	9 18**	7 76**	8 54**
Maharashtra	—	—	—	1 94	1 63	1 78
Tamilnadu	—	—	—	—	5 28**	4 65**
Haryana	—	—	—	—	—	3 51
Madhya Pradesh	—	—	—	—	—	—

$^{*}p < 05$ $^{**}p < 01$

Scrutiny of Table 2 indicates large variations in overall mean performance both in mathematics and language in class II across the DPEP states.

LEVEL OF PERFORMANCE IN MATHEMATICS

As regard the performance of students in mathematics, the students of Assam on an average have shown the highest performance while the students of Taimlnadu have shown the lowest performance. The next best performance have been shown by the students of Orissa followed by Haryana, Maharashtra and Madhya Pradesh

The mean performance of the students from Haryana in mathematics did not differ significantly from the mean performance of students from Maharashtra and Madhya Pradesh Similar phenomena was observed in respect of the mean performance of the students from Madhya Pradesh and Maharashtra However, the mean performance of the students of Assam in mathematics did differ significantly from the mean performance of students from Orissa, Maharashtra, Tamilnadu, Haryana and Madhya Pradesh Similarly, the mean performance of the students of Orissa did differ significantly from the mean performance of the students from Maharashtra, Tamilnadu and Madhya Pradesh as also the students of Maharashtra from the students of Tamilnadu and the students of Tamilnadu from the students of Haryana and Madhya Pradesh.

It is also evident from the results that the level of performance of the students of Assam, Orissa and Haryana was relatively higher than the students of Tamilnadu, Maharashtra and Madhya Pradesh.

LEVEL OF PERFORMANCE IN LANGUAGE

The students of Orissa have shown the highest average performance in the test of language in contrast to the students of Tamilnadu who have exhibited the lowest average performance The students of Assam and Haryana though a little lower than the students of Orissa in their average performance, their mean performance turned out to be almost identical. The students of Maharashtra and Madhya Pradesh have also shown almost identical average performance though lower than that of Assam and Haryana. Surprisingly the students of Tamilnadu have registered much lower average performance than the students of all other DPEP states.

A close scrutiny of Table 4 indicates that the average performance of the students of Assam did not differ significantly from the students of Orissa, and Haryana on the test of language. Similarly the mean performances of the students of Maharashtra in language did not differ significantly from the mean performance of students from Tamilnadu, Haryana and Madhya Pradesh However, significant difference in the mean performance in the test of language was observed between the students of Orissa and Tamilnadu, Orissa and Haryana, Orissa and Madhya Pradesh, Tamilnadu and Haryana, Tamilnadu and Madhya Pradesh and between the students of Assam and Tamilnadu and Assam and Madhya Pradesh, Assam and Maharashtra, and Haryana and Madhya Pradesh

It may be observed from the aforesaid discussion that the performance of the students in the test of language is almost identical in respect of the states of Orissa, Assam, Haryana, Maharashtra and Madhya Pradesh, the performance of the students of Tamilnadu has ben significantly much lower than the performance of students from the other states. The findings also reveal that the average performance of class II students in language has been found to be relatively better than the average performance of students in mathematics However, the average performance of the students of Tamilnadu is not only the lowest both in mathematics and language but also far below than the average performance of the students from the rest of the DPEP states.

TABLE 5

Gender-wise Variations in the Performance of Students in Mathematics

States	*Boys*		*Girls*		*"t" Values*
	M	*SD*	*M*	*SD*	
Assam	9.90	1.94	9.70	1.95	1.25
Orissa	7.84	2.63	7.69	2.60	1.18
Maharashtra	6.98	2.38	5.95	2.31	1.84
Tamilnadu	4.40	1.58	4.57	1.39	0.98
Haryana	7.10	2.20	6.70	2.19	1.92
Madhya Pradesh	6.11	2.54	5.58	2.41	1.78

GENDER-WISE PERFORMANCE IN MATHEMATICS

Table 5 elucidates that the average performance of the boys of Assam in Mathematics was higher than the boys of the rest of the DPEP states The next best performance was exhibited by the boys of the state of Orissa followed by the boys of Haryana, Maharashtra, Madhya Pradesh and Tamilnadu Similar trend was observed in respect of the average performance of girls across the DPEP states In addition to this, it is observed that the average performance of the boys was a little higher than that of girls across all the DPEP states, however, these differences were not statistically significant.

TABLE-6

Gender-wise Variations in the Performance of Students in Language

States	*Boys*		*Girls*		*'t' Values*
	M	*SD*	*M*	*Sd*	
Assam	11.97	3.18	10.83	2.93	1.81
Orissa	12.90	3.21	12.31	2.91	1.24
Maharashtra	10.14	2.63	9.64	2.53	1.73
Tamilnadu	7.03	1.19	7.36	1.94	0.93
Haryana	10.93	2.69	10.42	7.41	1.32
Madhya Pradesh	9.79	2.63	9.16	2.55	1.89

GENDER-WISE PERFORMANCE IN LANGUAGE

Table 6 reveals that the average performance of boys of the state of Orissa in language was higher than the boys of the rest of the DPEP states The next best performance was displayed by the boys of the state of Assam followed by the boys of Haryana, Maharashtra, Madhya Pradesh and Tamilnadu. Similar trend was observed in respect of the average performance of the girls across all the DPEP states. In addition to this, it is observed that the average performance of boys was a little higher than that of the girls across all the DPEP states. None of these differences turned out to be statistically significant.

It may be inferred from the aforesaid discussion that the average performance of the boys and the girls do not differ significantly both in mathematics and language across all the DPEP states. It signifies that the gender has no significant role to play in bringing out the differences insofar as learners' achievement in mathematics and language is concerned Interestingly both the boys and the girls have displayed relatively higher performance in language than in mathematics

TABLE 7
Area-wise Variations in the Performance of Students in Mathematics

States	Urban		Rural		"t" value
	M	SD	M	SD	
Assam	10 02	1.87	9 47	1 95	1 59
Orissa	8 23	2 4	7 59	2 62	1.13
Maharashtra	6.90	2 4	6 32	1 74	0 98
Tamilnadu*	—	—	—	—	—
Haryana	7.86	2 26	6 90	2 25	1.09
Madhya Pradesh	6 41	2 58	5 78	2 47	1 46

*Data were not available

AREA-WISE PERFORMANCE IN MATHEMATICS

An examination of Table 7 reveals that the students of Assam belonging to urban areas displayed higher average performance in mathematics than the students of the rest of the DPEP states. The next best performance was given by the students belonging to urban areas of Orissa followed by the students of Haryana, Maharashtra and Madhya Pradesh A similar trend was observed in respect of students belonging to rural areas in all DPEP states However, no significant diferences in the mean performances between the urban and rural students were observed in any of the DPEP states.

TABLE 8
Area-wise Variations in the Performance of Students in Language

State	Urban		Rural		"t" value
	M	S.D.	M	S D	
Assam	11.13	2.41	11 48	2.21	1 79
Orissa	14 04	3 11	11 96	2 87	1 92
Maharashtra	10 97	3 48	9 71	3.20	1 36
Tamilnadu*	-	-	-	-	-
Haryana	11 19	3 27	10 46	3 18	1 29
Madhya Pradesh	9 80	2 49	9 43	2 29	1.95

*Data were not avialable

AREA-WISE PERFORMANCE IN LANGUAGE

It is evident from Table 8 that the urban students from the state of Orissa displayed the highest mean performance in language than the rest of the DPEP states. The urban students from the state of Haryana were the next best followed by the urban students from Assam, Maharashtra, and Madhya Pradesh As regards the mean performance of rural students in language, the students from the state of Orissa still registered the highest performance followed by the students of Assam, Haryana, Madhya Perdesh and Maharashtra Urban students as a whole displayed better performance than their rural counterpart in all the DPEP states except in the state of Assam These differences were, however, not found to be statistically significant It may be concluded from the above discussion that the area (urban rural) as a variable does not play any significant role to alter the mean performance of the students both in mathematics and language It may also be inferred that the students from both the areas have displayed relatively better mean performance in language than in mathematics across all the DPEP states

TABLE 9
Category-wise Variations in the Performance of Students in Mathematics

State	*General*		*SC/ST*		*"t" value*
	M	*S D.*	*M*	*S D*	
Assam	9.77	1.86	8.98	2.34	2.51*
Orissa	8.62	2.51	7.06	2.57	2.42*
Maharashtra	7.76	2.39	6.11	2.32	1.74
Tamilnadu	4.63	1.60	4.77	1.46	1.87
Haryana	6.82	2.28	6.16	2.30	1.09
Madhya Pradesh	5.94	2.53	5.46	2.48	1.16

CATEGORY-WISE PERFORMANCE IN MATHEMATICS

A close scrutiny of Table 9 indicates that the mean performance of the general category students in mathematics from the state of Assam was higher than the general category students of the rest of the DPEP states. The next best in that category were the students from the state of Orissa followed by Maharashtra, Haryana and Madhya Pradesh The mean performance of the students belonging to general category from the state of Tamilnadu in mathematics turned out to be the lowest Similar trend was observed in case of scheduled castes and scheduled tribes students insofar as their performance in mathematics was concerned for almost all the DPEP states with Maharashtra and Haryana as an exception. The performance of students belonging to general category from the state of Maharashtra was higher than their counterpart in Haryana unlike the students belonging to scheduled castes and scheduled tribes Though the mean performance of students in mathematics belonging to the general category was better than their scheduled castes and scheduled tribes counterpart, most of these differences were not found to be statistically significant, except in the state of Assam and Orissa

TABLE 10
Category-wise Variations in the Performance of Students in language

State	*General*		*SC/ST*		*"t"value*
	M	*S D*	*M*	*S D*	
Assam	11.48	3.31	10.97	3.20	2.31*
Orissa	14.08	2.62	11.32	2.72	4.81*
Maharashtra	10.05	2.81	9.64	2.48	1.27
Tamilnadu	7.14	1.48	7.06	1.06	1.88
Haryana	10.96	2.71	9.98	2.63	3.81*
Madhya Pradesh	9.47	2.68	9.40	2.57	1.92

* $P < 0.05$

CATEGORY-WISE PERFORMANCE IN LANGUAGE

It may be observed from Table 10 that the mean performance of the students in language belonging to the general category from the state of Orissa was higher than the mean performance of the students of that category from the rest of the DPEP states. The next best performance in this category was displayedby the students of Assam followed by the students of Haryana, Maharashtra and Madhya Pradesh The students belonging to general category from the state of Tamilnadu exhibited the lowest mean performance in the language. The students from all the DPEP states belonging to scheduled castes and scheduled tribes displayed absolutely identical trend insofar as their mean performance in language was concerned Though the mean performance of students belonging to general category across all the DPEP states was higher in language than their counterpart, most of these differences were not found to be statistically significant except in the states of Assam, Orissa and Haryana

It may be inferred from the aforesaid discussion that the category as a variable does play a significant role to alter the mean performance of the students in mathematics and language It is also evident that the students belonging to both the categories have displayed relatively better mean performance in language than in mathematics.

CONCLUSION

The findings of the present investigation reveal large variations in the mean performance of the students both in mathematics and language across the DPEP states While some of these variations are significant, others are not

In the overall performance the learners have performed slightly better in language than in mathematics Further, it has been observed that two of the three demographic variables namely area and gender have not displayed any significant role in influencing the mean performance of students in both the foundation subjects. However, the category as a variable has displayed a significant role in both the subjects only in the states of Assam and Orissa and only in language in Haryana The findings of the present investigation also reveal that the gap in the mean performance of the students on the demographic profile, if any, at the later stages of school education may be due to the influence of input and process variables The overall situation across and within the state at the beginning of class II stage is very alarming inspite of all incentives and alternative strategies. This calls for increased attention towards planning strategies to improve the basic literacy and numeracy skills at the initial stage of primary education

For quality improvement and universalisation of education, it is imperative for the policy planners to take concrete steps to improve the quality of teaching by allocating the best human and physical resources. Inadequacies of inputs and problems in the management of inputs where the facilities have not been harnessed to their optimum have been the bane of primary education. As a suggestive measure preschooling facilities have to be improved in rural areas and must be treated as an integral part of primary school because it gives enough scope to the disadvantaged children to equip themeselves with the formal language at the primary stage. The curriculum, in turn, is not commensurate with the developmental stages of learners There is such a wide variety of potential amongst learners of the same age group, which cuts across all sectors and the curriculum has to provide for that The defect that has crept into the transactability of the curriculum needs to be rationalised on the basis of research input so as to bring it within the reach of every learner The teaching community particularly at the primary level has to be well qualified and trained to create a healthy learning environment in their classrooms. They need to be trained to carry out individualised instruction with a view to providing differential treatments for various categories of children so as to enable them to learn at their own pace.

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A Study of the Evaluation Practices in Primary Schools of Delhi

Sarla Rajput and Mamta Agrawal

The study examines the importance and significance of evaluation at the primary school stage as a device for quality improvement. The researchers attempted to find out the evaluation techniques and strategies in practice in 25 schools of various management categories of Delhi during 1994-95

Various instruments such as questionnaire, the diary maintained by the investigator, the question paper of class III, and report cards were used by researchers for collecting the data.

The findings show that (i) all the schools had a well designed system of evaluation, (ii) the weightage given to different tests and examinations were more or less same in all the schools except in Kendriya Vidyalaya, (iii) it was observed that more weightage is given to knowledge than to understanding and skill

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There has been a rapid and vast expansion of Primary Education in India since Independence as free and compulsory education till the age of 14 as was directed by our constitution under Directive Principles of State Policy But the universalisation of the primary education is still an elusive goal. Therefore, the NPE 1986[1] once again emphasised universal access and enrolment coupled with universal retention of children in schools. It also stressed a substantial improvement in the quality of education making it one of the thrust areas in primary education.

Primary Education is the most important stage in school education because this is the most formative period of a child's life. This stage of education covers the children of age 6 + to 11 + studying in classes I to V This is a very crucial stage in the life of a child It is the stage when significant physical, mental, emotional and spiritual growth takes place This is the time when basic concepts are formed, attitudes are developed and abilities of observation, reasoning, thinking, arguing etc , are developed in the child So much of growth takes place at this time simultaneously in all the aspects of the child's personality that it needs constant care and guidance. The school and the teacher play a very significant role in the multi-faceted development of the student In this whole interactive process evaluation has its own contribution Therefore, it is to be done particularly carefully at this stage, because the children are young and tender and no rigid system of evaluation should be imposed on them.

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[1] *National Policy on Education 1986* (with modification undertaken in 1992, Ministry of Human Resource Development, Department of Education, New Delhi, p 18

As evaluation is a strong device for quality improvement it should be in-built in the instructional process and programme of the primary education. Evaluation at this stage should be used basically for improving the learner achievement and for channelising his growth and development in the right direction rather than just assessing his performance For this a system of continuous recording of the progress and development of each child on the basis of observation and oral and written tests should be developed As advocated by the framework of the curriculum for the Ten Year School, promotion in primary stage of education should not be based on the annual examination at the end of each year, but on the record of progress as registered over the session.[2] Normally at primary stage all children should be promoted according to the framework but special attention should be given to the children who do not show adequate progress. Thus, the evaluation at primary level should be basically formative in nature, the purpose of which is to diagnose the weak points of the children so that the teachers can take timely measures for correction and remediation of the weakness The formative evaluation also provides feedback regarding the efficiency of the teaching methods so that teaching and learning can be improved. The formative evaluation should be done continuously throughout the year. It envisages the use of various techniques like observation, oral testing, written testing, rating scales, etc , for evaluating different aspects of pupils' growth, viz. cognitive, affective and psychomotor.

It is only through the use of evaluation in teaching and learning through out the session that appropriate growth of the students' abilities, attitudes, interests and social personal qualities can be ensured. Without proper evaluation at school the development of various aspects of the students' personality cannot be ascertained.

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[2] *Curriculum for the Ten Year School—A Framework*, National Council of Eduational Research and Training, 1975, p 43

Since evaluation is an intergral part of teaching-learning process it makes a very substantial contribution to classroom practices which have a direct bearing on school effectiveness However, evaluation, by and large, is not practised in the classroom as effectively as expected. In this backdrop this study was undertaken in the Department of Measurement and Evaluation, NCERT with a view to finding out all about the evaluation practices in framing schools in the 1994-95 school session The study tries to answer the following questions.

1 Whether evaluation is done in the primary schools at all. This doubt arises specially because of the non-detention policy or the automatic promotion in the school which is to be followed by the primary schools according to the New Policy of Education[3]
2 If at all evaluation is done, what procedure is followed, i.e. how frequently the tests/examinations are held and what weightages are given to different tests
3. What techniques of testing are followed in various classes of primary school.
4 Whether the question papers prepared in various subjects are balanced in nature?
5 Are the evaluation results used for diagnosis? Whether any remediation work is done by the school?
6. Are the non-scholastic areas of pupil growth also evaluated by the schools? What particular aspects are evaluated?

NATURE OF SAMPLE

According to the All India Educational Survey, 1986, there are 1962 Primary Schools in Delhi This number does not include those schools with are either unrecognised or a part of Secondary of Higher Secondary Schools In the light of the above it may be estimated that in 1994 there were about 2500 schools where primary education was being imparted.

Since the study concerns itself with the analysis of evaluation practices in primary schools of Delhi, the sample included various types of primary schools which are in existence in Delhi. It was seen that there are seven distinct types of schools in Delhi This categorisation is based on the type of management of the schools.

The following table shows the types of schools and the number included in the sample

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[3] N P.E, op cit, p 18

Sl No.	Types of Schools	Number taken
1	Government Schools	3
2	Government Aided Schools	4
3	MCD Schools	5
4	NDMC Schools	4
5	Kendriya Vidyalayas	2
6	Private Public Schools	5
7	Unrecongised Schools	2
	Total	25

These schools were taken from both urban and rural areas Though most of the schools were from urban areas, 6 schools were from Delhi Twenty schools were co-educational, 4 were boys schools and only 1 school was exclusively for girls.

INSTRUMENTS FOR DATA COLLECTION

To study the evaluation practices the following instruments were used

1 School questionnaire—it was meant to collect information regarding the schools.
2 Evaluation questionnaire—it was prepared to find out all about the evaluation practices in the schools.
3 Investigator's diary—it was used for entering their observation during the field visits.
4 The question papers of class III and report cards were collected from the schools for the purpose of analysis.

METHOD OF THE STUDY

For this study the investigators vistited all the schools personally and interviewed the headmasters/headmistresses and teachers on the basis of the questionnaires mentioned above They also noted their own observations regarding the evaluation practices in schools. From each school they collected the class III question papers and a copy of report card for the purpose of comparative analysis.

In the evaluation questionnaire the information was collected on the following points.

1. Number of terms in a session.
2. Number of examinations/tests conducted in the school and the weightages given to them.

3. Which techniques of testing are used and what weightages are given to them
4 Policy for promotion
5 Policy for diagnosis and remediation
6. Evaluation of non-scholastic areas
   - evaluation of social personal qualities
   - evaluation of interests
   - evaluation of values

The data collected through the questionnaire on these points was analysed and conclusions were drawn

The question papers of class III were analysed on the following points:

1 Weightages given to different objectives.
2 Weightages given to different forms of questions
3. Weightages given to different content areas.

After this analysis, the question papers of different schools were compared to see how far they were balanced.

The report cards from various schools were also analysed to see on which particular area of pupil growth the reporting is done by the schools and what weightages are given to various tests and examination for promotion.

CONCLUSIONS OF THE STUDY

After analysing all the data the investigators drew the following conclusions regarding the questions posed in the beginning.

1. The first question which came to mind while conducting the study was whether the evaluation is done at all in the primary schools There is a non-detention policy in the primary schools wherein the children are not to be detained in at least classes I and II and if possible in other classes also This policy gave rise to the doubt whether evalution was done at all in the schools. Since all the children were to be promoted to the next class there was no need of evaluation. But this notion proved false and the study revealed that all the schools had a well designed system of evaluation consisting of various class tests and examinations through out the year at least in the scholastic area.

2 As to the question how frequently the tests/examinations are held and what weightages are given to different tests, it was seen that most of the schools have a scheme of testing, consisting of quarterly, half-yearly and final examination punctuated by informal classroom test, which the schools keep at regular intervals

Table 1 shows the various tests and their weightages in different schools

TABLE 1
Tests/Examinations and Their Weightages

Sl No	*Schools*	*Class Test*	*Quarterly Exam*	*Half Yearly Exam*	*Annual Exam.*	*Project Work/ Assignments*
1	Govt Schools	Class test are held but no weightage is given	20%	20%	60%	—
2	Govt Aided Schools	-do-	20%	20%	60%	-
3	MCD Schools	-do-	20%	20%	60%	-
4	NDMC Schools	-do-	20%	20%	60%	-
5	Kendriya Vidyalayas	Unit tests 20%	-	20%	40%	20%
6	Private Public Schools		Each Public School has its own system			
7	Unrecognised schools	10%	20%	20%	50%	

Table 1 indicates that the weightages given to different tests and examinations are more or less same in all the schools managed by the state government and local bodies. Only Kendriya Vidyalayas give 20 per cent weightage to unit tests and 20 per cent to project work and assignments.

All public schools adopt their own system of evaluation In some schools like Mirambika School only project work is done In another school only regular unit tests are given whereas in others like Springdales School children are evaluted on their day to day work In some public schools there are half yearly and annual examinations only with the class tests.

3 Which techiques are adopted by the schools for evaluation? In answer, to this it was found that for doing continuous evaluation, by and large written tests are adopted by schools In some subjects like environmental studies and languages oral testing is done but it has very little weightage as compared to written tests

Private and public schools give more attention to assignments, project work and oral work than the state run schools.

Observation technique is also used for evaluating non-scholastic areas but it is not done systematically.

4 Are the question papers balanced? After analysing the question papers of various schools it was found that most of the question papers were not balanced.

In a question paper weightages should be allotted appropriately for various objectives like knowledge, understanding, application and skill. It was seen that in most of the schools the objective of knowledge was given 50 to 75 per cent weightage Understanding and application got very little weightage. This shows that the question papers of our primary schools are not designed to test higher mental abilities.

The following table shows the weightages assigned to different objectives in science by different Schools.

TABLE 2
Weightages of Different Objectives in Science

S No	*School*	*Knowledge*	*Under-standing*	*Application*	*Skill*
1	Govt. School	70%	20%	-	10%
2	Govt. Aided School	70%	20%	6%	4%
3	MCD Schools	65%	20%	-	15%
4	NDMC Schools	50%	10%	-	40%
5	Kendriya Vidyalayas	55%	20%	-	25%
6	Private Public Schools	46%	24%	12%	18%
7	Unrecognised Schools	40%	47%	-	13%

Table 2 indicates that the major share of weightages is allotted to knowledge and minimum to application. Even understanding has not received its due weightage. In fact a science question paper, to be balanced, needs approximately these weightages:

Knowledge 40 per cent, Applicataion 10 per cent and Skill 10 per cent

From this it can be assumed that the teachers do not have an idea of developing a good question paper. It was also seen that most of the schools test only the students' textual knowledge and fall short of testing higher mental abilities. Only private public schools give attenttion to the testing of higher mental abilities

As far as the types of questions are concerned, it was seen that most of the questions were of the short answer and very short answer variety. This is understandable also because at primary level the children are small and it is difficult for them to write large answers The objective type questions were totally lacking in the question papers perhaps because the teachers are not trained in developing such questions. As far as oral questions are concerned, the investigator could not get any question paper from any school.

5 Another question that was asked in the questionnaire was whether the schools used the evaluation results for diagnosing the weaknesses of children in different areas and whether they tried to remedy those weaknesses On this point the study revealed that diagnosis and remediation is not well organised in schools. Few diagnoses in an informal way goes on as a routine matter in all the schools and some measures of remediation are also taken in a routine manner. Most of the remediation is in-built with teaching Only very few schools give separate time taken from assembly, games period or music period, etc., to the weak children Only in DTEA School regular after the school remediation work is done and St. Columbus organised formal remediation classes with a separate teacher appointed for the purpose. Another measure taken up by schools for remediation is peer group or child to child teaching where the brighter children of the same class or sometimes senior children help the weaker ones. Some schools just inform the parents about the weakness and expect them to help their children

6 Regarding our question whether the non-scholastic areas of pupil growth are also evaluated and what particular aspects are evaluated, it was found that the evaluation of pupil's social personal qualities, his interests and values is not systematic Table 3 shows which schools evaluate which social personal qualities and interests, and whether they grade them and show then in the report card

Table 3 indicates that most of the schools in Delhi do try to report some social personal qualities but neither proper tools are used for evaluating these qualities, nor any records are kept even of informal observations At the time of filling up the report card the teacher grades the pupils on various traits on the basis of her impressions. In Government and MCD schools the only quality evaluated is cleanliness

As far as the interests of children are concerned most of the schools have activities like art, craft, music, dance, sports, etc. In some schools the interest of children are graded and some give remarks about them Many schools specially MCD schools and some Government aided schools do not report the interests at all

Regarding the evaluation of values it was found that schools in Delhi do try to inculcate socially accepted values in the children but they do not evaluate them at all.

Thus the study revealed that the schools do evaluate the children continuously as suggested by the frequency of formal and informal tests in various classes but it is not done comprehensively. It is only in a few schools that comprehensive evaluation is done, i e , along with scholastic areas non-scholastic areas are also covered. However, it was seen that it was not as systematically done as should have been.

TABLE 3

Evaluating Non-Scholastic Areas

S No	*Schools*	*Social personal qualities*	*Interests*	*Whether graded or not*	*Whether shown in report card or not*
1	Govt. School	Cleanliness	Drawing, music, dance, craft	No	Yes
2	Govt Aided School	Cleanliness, discipline, honesty, punctuality	Drawing, music, dance, craft	No	No
3	MCD Schools	Cleanliness, health	Drawing, music, dance, craft	No	No
4	NDMC Schools	Cleanliness, discipline, punctuality, cooperation	Drawing, Music, Dance, Craft and literary activity	5 point scale	Yes
5	Kendriya Vidyalayas	Leadership, responsibility, punctuality cooperation, cleanlincss	Reading interests and other hobbies	Remarks are given	Yes
6	Private Public Schools	Cleanliness, politeness, discipline, respect to the property of others	Music, art dramatics, creative activities	3 point scale	Yes
7	Unrecognised Schools	Cleanliness, discipline, punctuality, responsibility	Music, art, sports	3 or 5 point scale	Yes

It is basically because the managements of schools do not provide detailed guidelines for evaluation to their schools. Whatever guidelines are given are related to only the scholastic areas. The other reason for this is that the teachers do not have any training in the concept of evaluation and its importance in the teaching-learning process

In the study the MCD schools presented the most dismal picture as educational institutions. It is perhaps because they were understaffed, had large number of children and had very poor physical facilities. Even sitting arrangement was not found to be proper. On the contrary the public schools had very congenial atmosphere with proper physical facilities and qualified and well aware staff Even the unrecognised private schools seemed to be better off than MCD schools in this respect

SUGGESTIONS

On the basis of the above findings here are some suggestions which may help in improving the evaluation practices which are an integral part of classroom practices. This in turn will improve the quality of education which will result in changing the effectiveness of the primary schools of Delhi

1 The management like Delhi Administration, MCD and NDMC, etc , should work out detailed guidelines for continuous and comprehensive evaluation in schools. The NCERT has prepared a scheme of CCE for primary state, which can be referred to by these managements to prepare their own guidelines.

2. From time to time the schools should get the teachers oriented in evaluation strategies and training of good question papers.

3. Monitoring and supervision of evaluation in schools should be strengthened by the authorities of different managements.

4 Periodic benchmark evaluation studies should be carried out to find out the status position of the achievement of children in various types of schools in the state of Delhi. This will help the administration to identify the weaker schools so that they can provide special inputs to raise their standards.

5. DIETs can take the responsibility of providing readymade test material in different subjects for various classes for use of the teachers. In non-scholastic areas they can develop various tools which may be used by schools for evaluating social personal qualities, interests and values systematically.

6. The quality of a school largely depends on the leadership provided by the headmaster and monitoring carried out within the school. Arrangements need to be made for the training of head masters in various aspects of planning and management of Primary Schools.

The above discussion indicates that the measures to be adopted for improving effectiveness of evaluation practices in primary schools, five dimensions need immediate interventions. These dimensions are (i) facilities in the schools, (ii) proper time budgeting for teaching-learning, (iii) continuous and comprehensive evaluation of pupil growth,(iv) teachers' training in evaluation and (v) internal monitoring and external supervision.

Comprehensive Programme to Improve Classroom Interaction in Municipal Schools of Solapur

S.C. Agarkar and V.G. Gambhir

The study is based on a three-year comprehensive programme launched in the city of Solapur, India, covering 95 municipal schools. The study aimed at finding out answers to a set of three questions; (a) to find out real needs or teacher expectations from teacher training programme; (b) to design a teacher need-based programme; and (c) to explore the viability of using primary school teachers as resource persons

The study employed the methodology of empowering teachers by a well-designed, purpose oriented teacher training programme Specifically developed materials such as laboratory manuals, teachers' handboolks, and handouts were made available to resource persons and the teachers. School visits formed an essential component of the project. Periodic meetings to take stock of the situation were arranged for the resource persons

The results indicated that the primary teachers could successfully take up the role of the resource persons It was further found that it took roughly a period of 6 months to develop the required competence to perform the role of resource persons.The programme showed beyond doubt that the resources of the local voluntary and governmental agencies could be channelled effectively to carry out instructional innovations in the system.

INTRODUCTION

Homi Bhabha Centre for Science Education (HBCSE) at the Tata Institute of Fundamental Research (TIFR) has been concerned with the education of the disadvantaged students. In this context it had undertaken a variety of action research programmes both in rural and in urban areas to understand problems faced by these students. Based on the investigations of learning hurdles, it has developed appropriate remedial measures and field tested them for their effectiveness For an eventual absorption of these measures into the school system efforts were made to keep unit costs low and to work out a strategy simple enough to be handled by a typical Indian school. In order that educational innovations are implemented on a large scale, a cadre of resource persons needs to be created. With this view in mind a three-year comprehensive programme was launched in the city of Solapur covering 95 schools run by the Solapur Municipal Corporation The programme was implemented collaboratively by three organisations namely Solapur Science Centre (SSC), a voluntary organisation, Solapur Municipal Corporation (SMC), a self Government Organisation and Homi Bhabha Centre for Science Education, a research institution. Roles of the collaborating organisations were identified clearly prior to the commencement of the project. SSC accepted organisational responsibilities, undertook coordination job and arranged training courses, school visits and follow up seminars. The Education Department of SMC shouldered financial and administrative responsibilities. HBCSE provided academic leadership in terms of planning, execution and evaluation of the project.

THE SMC PRIMARY SCHOOL SYSTEM

The SMC primary school system is a considerably large system catering to almost 34 per cent of all the pupils studying in standard I to VII all over the city. Through its 95 schools situated in various parts of the city, it catered to about 3200 students coming mainly from economically weaker sections of the society. Almost 40 per cent of the pupils in these schools belong to SC/ST categories To meet the natural demand arising out of the multi-lingual characater of the city which is located at the borders of Maharashtra, Karnataka and Andhra Pradesh, SMC runs primary schools in four media—Marathi, Urdu, Kannada and Telugu In terms of administration, facilities available in schools, teacher profile, etc., the system resembles the typical Z.P. school system Most of the teachers in the SMC schools, too, are S S C., D. Ed, or have equivalent educational background Few of them have graduated in arts stream, externally. During the period of the project, hardly 4 out of 765 teachers in these schools were science graduates

WORKSHOPS FOR RESOURCE PERSONS

A group of twenty primary teachers was identified from the school system of SMC as resource persons. The responsibility of selection was entirely left to authorities in the education department of SMC, specially, to ADEIs who often visit the schools. A group of four members of Solapur Science Centre remained associated with the SMC group to help them in preparation and clarifying doubts whenever needed At the end of the first year of the project, ten more RPS were added to undertake extensive school visits.

Workshops for RPs were planned carefully as they formed an important link between HBCSE scientists and practising teachers The main aims of the workshop were to apprise the RPs with the needs and requirements of teachers and to equip them to conduct training courses for teachers In this context following requirements of teachers were discussed

1. Content Enrichment

Majority of the teachers at the primary level have a little formal exposure to the ever developing disciplines of science and mathematics Despite their inadequate background of the subject matter, they are expected to teach modern concepts like atomicity, static electricity, elements and compounds, etc., in science and proportions, graphs, etc., in mathematics. In such cases teachers resort to reading of textbooks without much explanations It is, therefore, quite necessary that conceptual understanding of teachers be enhanced through training courses In order to fulfil these requirements content enrichment sessions were arranged during the workshops

2. Linguistic Difficulties

The first generation learners often encounter difficulties of linguistic origin in their educational endeavour Since the language used in classroom is far different from colloquial language, the child is hardly able to benefit from classroom discourse. Linguistic underdevelopment handicaps the learners in many ways. They are neither able to participate in the discussion nor "read" the textbook profitably.

Problems related with linguistic difficulties of students call for systematic investigations. In the project undertaken by HBCES to understand the problem and to design plausible solutions, it was observed that mere simplification of the language of textbook led to better teacher-pupil interaction and to improvement in conceptual understanding. Since the text books were accepted as a non-negotiable parameter, it was suggested that teachers should deliberately, use simple language during explanatory conversations and summarise in textual description.

3. Concrete Experiences

Students in the primary schools are mostly at the concrete operational level. It is, therefore, imperative that concrete experiences are offered to the students to facilitate acquisition of information One of the difficulties encountered in this context pertains to the limited experiences of teachers. For example, primary teachers have hardly experienced microscopic examination of a cell, electrolysis of water, or electrical conductivity of graphite Such experiences need to be made available to the teachers during their in-service training

Even though the primary school teachers realise the importance of experimentation, they are handicapped due to lack of material resources. In order to tackle this problem, low cost experimental programme needs to be designed using easily available material HBCSE has developed a kit of apparatus, from material available around, which can be utilised to conduct a large number of experiments RPs were offered an opportunity to use the kit during the workshop

Taking into account the above considerations, workshops for resource persons were planned. They comprised discussion sessions, lab-activities and group work The salient aspect of the RP workshop was the integration of content with pedagogy. A central theme of the topic under consideration was explained, difficulties encountered by teachers and pupils were highlighted, and pedagogic suggestions for effective teaching were offered. At times, models of effective teaching for some concepts were also demonstrated.

Group discussions during RP workshops were used to work out topic by topic list of difficulties, plausible classroom solutions and activities to be performed by teachers and students. In addition, RPs were also engaged in identifying lesson-wise central themes and teaching points in science and mathematics during group discussions.

Since the workshops were aimed at enabling RPs to undertake teacher training, efforts were also made to build positive self concept, adequate confidence to guide their own colleagues and to provide sufficiently strong base of content and pedagogy Apart from general suggestions given during the workshops RPs were offered individual guidance in planning their presentations.

Apart from content and pedagogy, RPs were trained for monitoring of the project. The needs to observe lessons and to offer on-the-spot guidance to teachers were convinced. The strategy of school visit programme was explained The tool developed to quantify teachers classroom behaviour was discussed A model lesson was arranged to provide practise in using the tool Every year two workshops were arranged for the RPs In addition, two laboratory sessions were organised to provide opportunities to conduct experiments related to the content covered during the workshops In these sessions emphasis remained on demonstrations of relevant alternative experiments, and on the ways in which they can be presented in the classroom Efforts were also made to highlight, through examples, that pedagogy of demonstrating and experiment in the classroom, really, decides its effectiveness and educational value

TEACHER TRAINING

Resource persons oriented by HBCSE conducted training courses for all the teachers from 95 schools of SMC For the sake of convenience, these courses were organised in three different media: Marathi, Kannada and Urdu by specifically identified groups of RPs. In a three year project standards I-IV were covered in the first year, standards V and VI in the second year and standard VII in the third year.

Based on the inputs given during workshops the RPs endeavoured to conduct courses for teachers. Initially, for about two courses, many of them resorted to duplication of the RP workshop. By the third training course teachers started preparing on their own Similarly, the confidence of resource persons took shape gradually Since the RPs were expected to stand before their own colleagues, they had great apprehension to begin with. The fear of unacceptability, however, faded soon and RPs could conduct training courses with adequate confidence In the first year, members of HBCSE or SSC were often called upon to initiate discussion and to answer teachers' queries. By the third year the picture changed totally and the RPs handled all aspects of training on their own.

The behaviour of RPs during the courses is worth mentioning Each group of RPs (formed language-wise) chose a leader who would coordinate the efforts of different members. The leader asssigned topics, helped RPs in planning their lecture sessions and intervened during the sessions to ensure that discussion remained on track At times, RPs adopted multi-teacher mode of discussion where a topic was jointly presented by two or three RPs One or two persons demonstrated experiments and the other discussed the relevant content. During the later part of the presentation they interchanged their roles. In some cases a topic was divided into sub-topics, each sub-topic was discussed by separate RPs, then finally was summarised by their leader This type of team teaching was appreciated by teachers.

For many RPs, it was the very first experience to guide, academically, their own colleagues Also, for the teachers it was surprising to know that the experts in the course were none other than their own colleagues Many of the teacher participants possessed a larger teaching experience than that of some resource persons The problem of academic superiority, therefore, crept in Teachers sometimes started teasing RPs and interfering with the discussion. However, since the problem was anticipated and necessary guidelines were given, RPs could tackle these situations tactfully and create favourable atmosphere through their sincere efforts

MATERIAL SUPPLIED

Apart from guidelines given through training courses, specifically developed materials were made available to RPs and to teachers. Nature of material given is described below.

1. *Laboratory Manual.* A mention has already been made above of the low cost laboratory kit Since the kit contained mostly the easily available things it was considered unnecessary to give a ready-made kit, either to schools or to teachers. Rather, the teachers were encouraged to assemble their own kits. The suggestion received positive response and kits started taking shape in many of the schools. In order to guide the teachers to use it effectively, laboratory manual consisting of about 25 illustrative experiments was made available to all the schools.

2. *Teachers' Handbooks.* Handbooks for standard I to IV prepared by HBCSE and published by Bureau of Text Book Production were given to resource persons. These handbooks could not be supplied to teachers because of their non-availability in sufficient numbers. However, handbook covering topics of upper primary classes was made available to the teachers.

3 *Hand-outs·* Special hand-outs, based on certain topics in science and mathematics, were prepared and distributed among the teachers. These hand-outs originally prepared in Marathi were translated in other languages by resource persons.

SCHOOL VISITS

School visits formed an essential component of the project Because the number of schools was large, members of HBCSE or SSC could not visit all the schools. Nevertheless, RPs formed small groups, divided their work judiciously and visited each school once in two months. During their school visits RPs were expected to observe lessons and interact with teachers As stated earlier RPs were given the tool of lesson observations and were trained to use it With the help of this tool RPs graded teachers performance in the classroom.

The school visit programme proved useful in many ways. It strengthened the bonds between teachers and resource persons RPs review of the lesson could provide immediate feedback to the teachers for improvement. Also, RPs could get considerable insight into the needs and requirements of teachers. Even though the RPs themselves were in the teaching profession, they had hardly any opportunity to observe classroom interaction in such detail. The school visits offered them a chance to look at teacher-pupil interaction objectively and critically. This exposure played a major role in developing a proper viewpoint among the resource persons.

Members of HBCES did a sample check by visiting some schools periodically The sample was chosen judiciously involving schools from slums, from industrial belt and form middle class localities Visits to these schools offered them an opportunity for the formative evaluation of programme

PERIODIC MEETINGS

As a part of follow up programme, bimonthly meetings were arranged for resource persons The main aim of the meetings were to take a stock of the situation and to work out a plan for future course of action During the meetings RPs were encouraged to share their experiences of school visits freely. Exchange of experiences and the analysis of quantified data collected from lesson observations enabled one to judge how far the changes have taken place and which aspects needed more attention Based on this feedback operational hints were given to RPs who were expected to pass them on to teachers during their future school visits

EVALUATION

Lesson observations, both by RPs, and HBCSE members were made. A team of at least two observers observed the lesson, one of them used to record frequency of desirable instances, as and when they occurred while the other remained watchful towards aspects related to the quality of interaction and made appropriate notings. Later, grading of the performance on various issues of classroom interaction was done jointly by these observers.

Some salient points revealed by lesson observations are enlisted below. For the sake of convenience observations in phase I (entry period) and phase II (exit period) are presented

1 6 percent of the lessons observed by HBCSE team during phase I of first year (standard I to IV) show not a single instance where the teacher had deliberately discussed some daily life experiences not referred to by textbooks or similar textual materials 56 per cent remaining lessons showed nearly 5 or more such instances per lesson In phase II, however, percentage of lessons in these categories were 27 and 73, respectively
2. Instances of pupils contributing their own observations and experiences to the discussion—
   Phase I : 55 per cent lessons without any instance.
   . 45 per cent lessons showing 1-5 instances
   Phase II . 19 per cent lessons with zero occurrence.
   81 per cent lessons showing 1-5 instances
3 The tendency to limit the opportunities for pupil participation to simply getting the expected, typically textual answers to questions asked was noticed to be very high, in phase I—73 per cent of the

lessons observed; in phase II it had lowered down considerably to 23 per cent.

4 Occurrence of certain pupil behaviours, however small in number, can be viewed as indicator of quality of teacher-pupil interaction and open, permissive attitude of the teacher A pupil openly expressing his disagreement with the teacher, or expressing his own different views, is one such behaviour. Records of almost 40 per cent of the lessons in phase II indicate occurrence of such instances in those classes Incidence of such occurrences was seen in only 18 per cent of the lessons observed in phase I.

5. Instances of science experiments/activities being demonstrated in the classes, even while the project had entered its second year, remained too small, hardly 10 per cent of the total lessons observed by HBCSE team at that time (N = 100) displayed activity focus

Figures 1, 2, and 3 present changes in teacher-pupil interaction graphically. In this presentation three year period is divided into six phases of six months each It is evident from these figures that classroom interaction showed positive trend as the project progressed

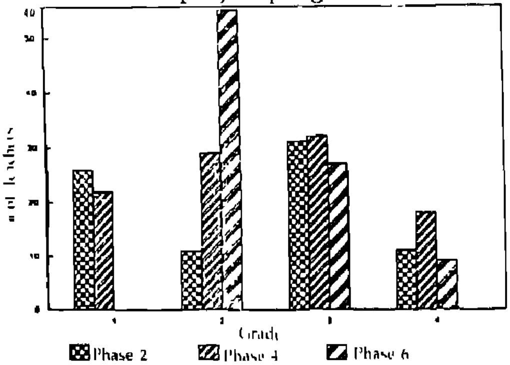

Figure 1. Opportunities for pupils' active participation in science

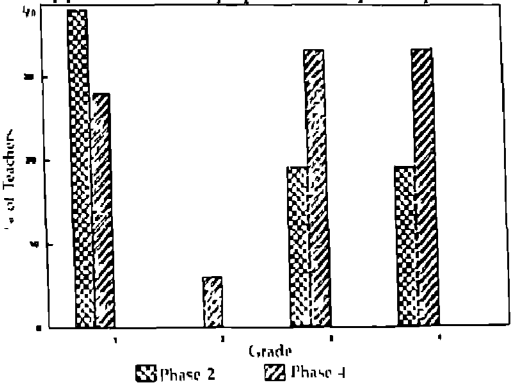

Figure 2 Opportunities for pupils' active participation in mathematics

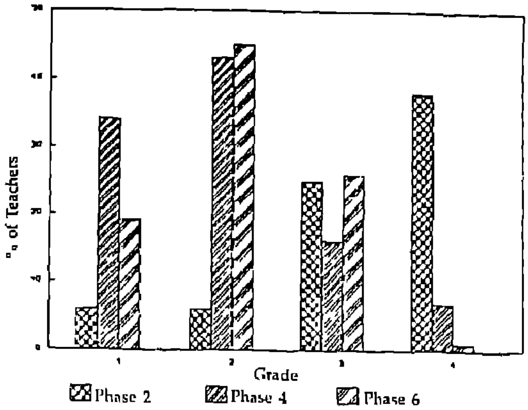

Figure 3. Highlighting similarities and differences, classification skills.

IMPLICATIONS OF THE PROJECT

The programme showed beyond doubt that the resources of the local voluntary and governmental agencies can be channelised effectively to carry out instructional innovations in the system. It has also shown that such an innovative work can be cost-effective in terms of material, manpower and finances and lead to noticeable changes in the classroom interaction. The programme, therefore, have wider implications not only for our country but also for the proverty stricken Third World as its findings have indicated possibilites of improving education despite lack of funds and lacunae inherited by the system.

Reforming Classroom Instructional Practices in Small Size Primary Schools: Teachers' Perception

Sandhya Paranjpe

The study assesses teachers' perceptions of the need for reforms, identify problems faced by teachers in implementing new instructional practices, and to delineate suitable intervention strategies for facilitating reform

The research study is field based, using a qualitative approach for purposes of data collection. Informal interviews, with open ended questions, were conducted individually with all the teachers included in the sample (143) The data were analysed with reference to three objectives Analysis yielded a wide variety of inputs and school-community combined efforts as prerequisites for reform in classroom instruction.

The findings suggest sequential steps to initiate process of change. These are (a) exposure of teachers to the model demonstration schools, (b) periodic onsite school based training, (c) trailing out the practices imparted through training, reviewing and evaluation by all "stakeholders" especially by participating teachers. Further, the need for building a strong competence base in teachers for the organisation of small schools including the aspects of multigrade teaching was highlighted

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INTRODUCTION

School reform for quality improvement has gained paramount importance in education, with various demands being made on schools to change, revitalise, restructure and reform. Concerted national efforts are afoot on improving both the quality and efficiency of schooling with the specific intenion of implementing reforms so that resultant desirable changes are visible within classroom settings and practices particularly in rural areas of the country

Education is a complex system and its change is even more complex.

The concept of change includes positive ideas such as innovation, development, progression, renewal, reform and so on and negative ideas like disaster, catastrophe and others within a broad operational framework Change can be planned or unplanned, major or minor, voluntary or imposed, slow or fast, intentional or unintentional amongst other characteristics, all however involving some kind or form of organisation and structure. Change as it applies to schools may be classified into two major categories. external or internal (Vecchio 1991; Rue and Byars 1992) or voluntary and imposed While there is a difference between the types of changes all change within schools involves people, loss, anxiety and struggle Change, therefore, represents a serious personal and collective experience characterised by ambivalence and uncertainty (Fullan 1991)

New classroom reform programmes/strategies necessarily demand that teachers try out different instructional materials, methods, equipments implying wholesale change. This becomes all the more problematic in small size primary schools in remote rural areas having only one or two teachers catering largely to the marginalised sections of society. This coupled with greater professional isolation of teachers, lack of infrastructural facilities, multigrade and multi-level teaching amongst other factors further aggravates the situation. The stark reality is that classroom reform for quality improvement remains a policy rhetoric and an elusive distant goal

What needs to be recognised is that there are a number of obstacles/barriers inhibiting reform being effected or creating schools that are able to incorporate demands and resultant changes as part of their normal organisational life. This becomes all the more complex within classrooms as it involves a variety of "stakeholders."

The meaning that participants in the actual change process attach to a change effort is critical to the eventual success of any kind of reform. If the change effort is not understood and owned by the stakeholders the level of committment and involvement to change diminishes In reality teachers cannot decide whether to change, they can only decide how to change (Tracey 1990). This is very true of the Indian situation where change is imposed in a "top-down" manner As teachers are the focal point of any change effort in schools, their perceptions are crucial variables in reforming classroom instructional practices. Thus it becomes necessary to focus on their views regarding the so called "desirable" reforms that simply change in their daily work life

Acknowledging the above scenario the present research study attempts to assess teachers perceptions on the need to reform existing classroom instructional practices in small size primary schools, problems faced in doing so and ways to resolve the same. For puposes of this study a small size primary school has been operationally defined as: "a school having an enrolment less than 50 students from class I to IV with single or two teachers on the rolls "

OBJECTIVES

1 To assess teachers' perceptions on the need for reforming classroom instructional practices, in small size primary schools
2. To identify problems faced by teachers in implementing new classroom instructional practices, in small size primary schools.
3 To delineate suitable intervention strategies for facilitating reform of classroom instructional practices within small size primary schools.

RESEARCH DESIGN

The research was essentially field based using a qualitative approach for purposes of data collection, due to lack of previous work in the area of concern. The limitations associated with this method of study—particularly those relating to the small sample size are acknowledged. However, the teachers perceptions, regarding reform of classroom practices are important so as to highlight real problems generated and faced by them and methods of resolving the same in the current period of a rapidly changing educational scenario.

Sample

The study was conducted in four randomly selected rural blocks from four educationally backward districts of Maharashtra. Within each of the blocks a list of small size primary schools was drawn up based on the operational definition given earlier on in the introduction. Form each of the four lists 20 schools were randomly selected. The total sample comprised 80 schools having 173 teachers. A census approach was adopted for conducting interviews with teachers.

Instruments Used

Informal interviews were conducted individually with all the teachers in the sample, in the regional language, i e , Marathi. Teachers were asked to respond to a series of open ended questions and were encouraged to express their ideas freely and to expand on the questions. Because of this format the length and sequence of the interview was largely determined by each individual teacher and varied from one respondent to another.

Data Collection and Analysis

The interviews were conducted over a period of nearly 18 months in the sampled schools Notes were taken by the researcher during the course of the interviews and these were expanded upon immediately on completion of the interviews. Content analysis was done of the collected information highlighting the major results of the study

RESULTS AND DISCUSSIONS

Results will be presented under three sections corresponding to each of the objectives stated earlier on in this paper

Section I

Analysis of the interviews revealed that majority of the teachers (80 per cent) did not feel it was necessary to implement such a wide variety of reforms/changes in existing classroom practices

They were quite content with the present level of students' performance, though they did feel that it could be improved upon if better facilities, regular practical training and support was given to them. They categorically stated that "we are never involved in deciding what kind of reforms are required nor do we have any choice or option regarding implementation of the same within our own schools " Stressing on this dismal state of affairs they further elaborated that "Reform prioritisation is required as some changes are needed but not too many at one time as is presently being advocated by educational authorities." They perceived that change is required but in a gradual manner, wherein prior preparation of all those involved is absolutely necessary, i e., school teachers, block/cluster level authorities, training institutions, parents and the students if it is to be successful and sustainable

During the course of the interviews it was quite clear that the apathy, disinterest and negative attitudes that emerged towards classroom reforms were due to a number of pull-back factors that are inextricably interlinked. However, for purposes of simplification they have been presented separately below

Lack of Understanding and Clarity

The major stumbling block was that new reforms are imposed in a "top-down" manner Teachers did not fully understand the nature nor the need for change and more importantly what was specifically expected of them in terms of their roles, responsibilities and functions

Existing low levels of students achievement was not perceived by them as "their" problem Nearly 60 per cent of the respondents felt it was the responsibility of the students themselves and parents Teachers thus placed the onus of responsibility on factors outside their control What is highlighted is that teachers did not perceive that a problem existed and even if they did it was not viewed as their problem. Probably this led to their perception that change was not required.

It seems to be quite clear that lack of preparation of the main change agents in the reform process could result in an organisational drift far from effective change especially in small size schools, where the entire responsibility both administrative and academic, rests on a single or two teachers.

Lack of Involvement in Planning

Closely related to the first factor is that teachers in India particularly at the primary level, are hardly ever involved in planning or decision-making regarding reforms or innovations. The respondents perceived that they are treated as outsiders by the local education authorities or "higher-ups" with "thinking/planning" being done at the top of the educational hierarchy and the more difficult task of "doing" at the bottom. Yet, paradoxically accountability for desired change which is more difficult being action oriented and time consuming, rests at the bottom

Teachers explicitly stated that their views and opinions should be considered as it is they who interact on a daily basis with the students thus knowing their needs and requirements.

Professional and Social Isolation

A feeling of isolation was felt by all the respondents. This could be accounted for, as primary school teachers are located at practically the lowest level of the educational heirarchy where there is relatively more isolation than at the top, more so in small size primary schools that generally exist in remote rural areas.

It was reported by the teachers that there were no peer groups to interact with, test out new ideas or provide feedback about reforms. It was strongly felt that some kind of network is essential, as it would help in trying out and accepting new ideas and strategies through exchange of views/visits with "others" in similar situations. This would probably also help in changing their negative attitudes

At this juncture it needs to be mentioned that these were the views exposed despite the fact that most of the sampled schools belonged to clusters of 8-10 schools, with a lead school in the blocks visited. Indirectly this indicates that clustering did not seem to have the effect for which it was established, i e , extending support, cooperation, venue for discussions opportunity to visit better schools, and see ongoing practices

To sum it up, lack of effective communication and support networks with peers either for geographical or organisational/administrative reasons, tends to work against the easy acceptance and adoption of new reform programmes/practices.

Lack of Necessaary Information Knowledge and Skills

A major deterrent in teachers hesitating to implement changes was the feeling of helplessness and incompetence to do so successfully, due to lack of necessary information, knowledge and skills

All the respondents stressed that adequate skills need to be developed and nurtured on a long-term basis in areas such as curriculum transaction, MLL attainment, use of Operation Blackboard (OB) kits, preparation of low cost teaching aids amongst other operational areas with particular reference to small size schools.

Periodic short-term in-service training programmes were perceived to be more useful than one long-term programme once or twice a year, as is being practised presently.

Further Threat to the Existing Poor Quality of Working Life (QWL) Environment

Introduction of a number of changes in the working life environment of teachers led to a feeling of ambiguity and instability regarding their job/duties, fearing change due to

- the different ways in which theirdaily work and activities are to be done and the impact of this change on customary ways of working;
- anxiety that there may be loss of power, prestige or status if they cannot accomplish the changes so desired by the "higher-ups",
- transfer to other schools

Teachers were in total agreement that virtually all reforms at the classroom level increased the complexity of their QWL which was already poor It was expected that they try out new teaching behaviours, methods, materials, procedures of assessment and evaluation; when they already faced existing problems of multigrade and multi-level teaching with almost negligible infrastructural facilities.

They reported that authorities had to a certain extent tried to counteract these problems through training programmes Unfortunately the training imparted had its own set of problems and deficiences as perceived by the respondents.

Poor infrastructural facilities and meagre resources. Practically all the sampled schools were one-room buildings with more then 50 per cent in a dilapidated condition within unhygienic surroundings, so that even the open space around the school could not be utilised for seating classes Poor physical conditions coupled with negligible equipment like charts, maps, globes, flash cards and toys made teaching all the more difficult Sixty per cent of the blackboards were in an unusable condition Lack of either human, financial or material resources has practical implications as was repeatedly emphasised by the teachers, deterring attempts to innovate or change existing instructional practices.

The problem is further compounded by the lack of clarity about resource requirements on the part of educational authorities at the block/district level, where decisions regarding allocation of funds, quality and type of materials, etc., is made. In appropriate methods of resource management and political perspective that dominates resource allocation worsens the situation furthei. Use of resources should necessarily be a proactive and not a reactive activity as it is at present, in the sampled schools.

It was interesting to note that in the sample of 173 teachers there were 17 who were single teachers, yet their perceptions did not vary significantly as compared to teachers belonging to two-teachers schools. Probably this could be due to their low representation in the sample or the phenomenon of teacher absenteeism and frequent deputation reported by respondents in two-teacher schools, ultimately leaving one teacher to manage the situation Although single teachers faced the same problems the intensity and complexity was definitely felt to a greater degree They were vehement in stating that it was extremely difficult almost next to impossible to implement changes all by themselves and therefore did not want any reforms at all

Section II

In order to realise the second objective it was felt necessary to ask the respondents to react to and detail out problems in a number of areas in which reforms/changes were being currently advocated by educational authorities based on the National Policy on Education (NPE) 1986 and the Programme of Action (POA). The areas related to classroom instructional practices are as follows:

- attainment of Minimum Levels of Learning (MLL) and subsequent increase in performance level of students;
- greater use of activity-based approaches;
- joyful, participative interactive teaching-learning;
- child centred education;

- continuous comprehensive evaluation;
- provision of continuous feedback to students;
- assessment

Majority of the teachers ackowledged that they had been asked to bring about changes related to all the areas mentioned above at sometime or the other in the last two years. There was a greater emphasis placed on implementing change with the launching of the District Primary Education Programme (DPEP) in their districts They were appreciative that training inputs were also being provided in some of the areas to facilitate change. However, the training had many lacunae as it needed to be more practical, need-based, regular with continuous on site support being practised after training was completed

Keeping in view, the small size of their schools and the areas of reform mentioned, the problems faced by the respondents in implementing change within their classrooms are detailed out below:

Lack of Skill in Handling Multigrade Classes

The need to handle teaching in multigrade situations on a continuous basis is a basic prerequisite in practically all small size primary schools. Teachers felt that they did not have the necessary skills to do so in a structured, systematic manner, due to lack of practical training. With classroom changes being enforced they felt further incapacitated and faced more problems in trying to implement changes related to MLL attainment and activity based approaches.

The specific areas of difficulty focussing on classroom related practices that emerged during the interviews were

- planning for multigrade teaching in a structured manner,
- organisation of children into combined classes/within combined classes into groups;
- types of activities to be encouraged—its periodicity, sequencing and organisation in relation to MLL attainment, assessment and evaluation;
- time scheduling—weekly/daily especially for classes 1 and 2 where the childrens' attention span is more limited and of a shorter duration than those in classes 3 and 4;
- striking a judicious balance between individual work and group work. The manner in which it is to be given, feedback mechanisms to be used to improve learning;
- classroom management in one-room buildings.

Teaching-Learning Activities

Policy documents and authorities advocate participatory, interactive teaching-learning. Paradoxically, the situation in the sampled schools was in total contrast. Teachers reported that they combined classes and taught from the textbook or asked the students to read after which they explained what was read.

Despite the numbers being small, due to combined classes being held, individual participation even through asking questions was almost negligible. Hardly any time was being spent on revision of what was done the previous day.

A major problem was the lack of individual attention being paid to students Only 20 per cent teachers reported encouraging students to talk, narrate stories or experiences related to their daily lives

Homework was given once or twice a week and not checked regularly by nearly half the teachers. Playing with toys or games was almost non-existent as there were hardly any available The teacher had no time to develop low cost teaching aids as they had to commute long distances to come to school, and had no training to do so effectively

Teachers felt frustrated and helpless given this kind of a situation making it extremely difficult to inculcate a joyful, participatory atmosphere Changes in this direction were thus viewed with apprehension by nearly 75 per cent of the sampled teachers.

Multi-level Teaching

Dealing with children who have different levels of abilities, working at a varying pace and are of different ages within multigrade small size schools, poses a tremendous challenge to teachers

Multi-level instruction within multigrade situations deters the process of change or reforms all the more. All the sampled teachers were explicit in stating that inputs were absolutely necessary on what methods were the most beneficial. They felt peer group learning, self learning and the need for instructional materials that would foster the interaction of both multigrade and multi-level teaching was required. Over the years they felt that dealing with multigrade teaching was relatively easier than multi-level teaching. Probably remedial and enrichment instruction would also help children to learn better in their schools

Preparation of Low Cost Teaching Aids

In the near total absence of proper materials, equipment and meagre resources teachers stressed on the urgent need for training to be imparted in the preparation of low cost teaching aids for group work in combined classes Another aspect that was highlighted was to ensure that the training also led to the identification and use of proper linkages between the developed teaching aids and textual material in group settings

In schools where Operation Blackboard (OB) kits had been supplied the teachers were not using it either due to lack of training or fear that it would get spoilt In these schools teachers indicated a desire for training in the use of OB kits to achieve MLLs and making learning a joyful activity that was also child centred.

As reported earlier most of the blackboards were in an unusable condition. In such situation reforms and changes related to curriculum transaction was all the more problematic with teachers feeling more handicapped in either implementing or changing existing instructional practices To counteract this they indicated the need to be informed about other aids that could be used to facilitate easy interaction and learning amongst students in combined classes, besides the blackboard

Promoting Self Study among Students

Promoting individual work is difficult in multigrade / multi-level classroom situations Considering this, the urgency to promote self study amongst students was acknowledged to be an advantageous area However, the respondents had hardly any information, skills nor materials to promote this habit amongst their students Self-instructional textbooks they felt would go a long way in promoting active learning, decision-making, thinking, group discussion and observation in a systematic procedure Besides this, it would also give them sometime to plan other academic activities and carry out their administrative responsibilities

The difficulty lay in inculcating this method of learning amongst their students simultaneously making it interesting to do.

Assessment and Evaluation of Students' Work

Any kind of reform or change is dependent upon assessment and evaluation of the students' work In view of the need for implementing the reforms mentioned above, teachers felt incapacitated in performing these two major tasks, especially as it required a lot of time and planning.

They were eager to receive orientation on new, easy methods of translating direct observation into technical assessment as also procedures to involve students in their own evaluation and assessment.

A crucial feature expressed by teachers was the need for knowledge on mechanisms for providing immediate feedback to students

Grouping Procedures

Critical to both multigrade and multi-level teaching is the requirement of understanding and developing skills in placing students into workable groups of various kinds Grouping procedures require the development of requisite skills and techniques related to:

- formation of workable groups of different sizes;
- organisation of the time table and classes;
- identification of suitable activities depending on the group size and goal of the group exercises,
- development and use of appropriate aids,
- dealing with children with special needs (slow learners) and poor attendance disrupting group work; were some important aspects highlighted by the respondents that affected their own pace of work and realisation of goals and objectives in consonance with reforms/changes.

In view of all the problems discussed teachers were asked to suggest strategies to resolve the same

Section III

Acknowledging the rapidly changing educational scenario and constant demands being made on them to implement a wide variety of reforms/changes within classrooms and ensuing problems, teachers were quite clear and explicit in suggesting ways to accomplish the above reforms successfully, which the researcher views as "push-forward" factors

The foremost strategy as viewed by them was to establish and maintain a continuous dialogue from the very beginning of any change process, between all the "participants." This was a dire necessity required to make teachers, students and community feel involved and responsible for change implementation. It is through discussions between all "stakeholders" that the school-community can decide with the education authorities as to what kind of change is required, prioritise reforms needed and identify appropriate methods of achieving the same.

The real challenge as viewed by the respondents lay in developing an appropriate methodology for giving impetus to school/classroom reform. Central to evolving any kind of methodology is the need to understand very clearly the school's present position, future goals, assess the structures/resources available and necessary, as also information, knowledge and new skills required to attain desired changes. "School/teacher readiness is imperative for any type of classroom reform which was totally lacking" was stated by practically all the teachers Prior preparation implies not only attitudinal readiness on the part of teachers but also improving the infrastructural facilities in terms of materials, aids and equipment, so necessary for change to be effective particularly in small size schools wherein multigrade and multi-level teaching is predominant

Readiness it was perceived could be largely achieved through training that is practical, geared towards the specific needs of small size schools taking into account existing problems being faced by teachers. The training design needs to be a continuous activity and not a one time input, focussing on specific areas of improvement. To make training more useful and viable, more thant 75 per cent of the teachers stressed on the need for short term, regular, onsite, school-based training. This they felt was crucial so that they could actually see if the training being imparted in the use of new methods for classroom reform were workable or not

To strengthen training inputs further, it was suggested that effective teacher peer groups be established and a small size model lead school be identified for observation, experimentation of practices, holding meetings and exchanging information This was stressed repeatedly as their organisations were either single- or two-teacher schools that required a lot of on site support.

The requirement of a mobile expert coordinator or a team of two if possible to provide onging support, advice and help after the initial training was imparted, also emerged as a desirable proposition during the interviews. It was also suggested that the expert or team could be ideally located at the cluster level lead school, to overcome the major problem of commuting. This facilitator could also coordinate school-community discussions, help in orienting the villagers about the changes being implemented and facilitate their participation in their children's education.

Based on the above views and perceptions of teachers on how to improve the existing situation and attitudes towards reforms/changes, the researcher has attempted to outline a cohesive action plan detailed out below.

The Emerging Methodology

School-community reflection with educational authorities implying a continuous dialogue is not only a basic prerequsite but is viewed as a necessary ongoing activity underlying the entire classroom reform process It is important to create the "Reflective School-Community"

It is crucial that the above three "partners" analyse the schools' position on a continuum of educational change, (Paranjpe, S 1995) and finally decide upon, which reform is the most critical for children-community. Based on this exercise other inputs are to be worked out. With this kind of a background the action plan should necessarily incorporate various elements to effect successful classroom change in existing practices The basic unit of planning and implementation being a cluster, the elements/factors required are given below:

- Identification of a small size lead model school. This is to be used as a demonstration school with the main objective of showing teachers that the desired new practices work within a multigrade/multi-level school environment. This is the key element in the entire change strategy and their role in reducing uncertainty and ambiguity cannot be over emphasised.
- Identification of 8 to 10 small size single/two-teacher schools The schools should be identified keeping in view the similarities with the lead school and easy accessibility to the demonstration model school
- Establishing peer group networks between the participating teachers.
- Training is to be designed as a continuous process in which information, knowledge and skills related to the desired reform practices should be imparted to teachers of one identified cluster

The training process should focus upon the key elements of:

(i) visits to the demonstration model lead schools,
(ii) short-term exposure/orientation/practice, which is demonstration school-based in 3 to 4 programmes spread out over a period of approximately six months,
(iii) monthly meetings as a follow-up of training inputs and its practice in individual schools,
(iv) provision of feedback into training through reflection and review of the three partners on the action taken

- Services of a mobile facilitator/expert coordinator visiting 8 to 10 schools of a given cluster. This forms an essential input in providing support, advice and supervision to teachers involved in the change process.
- A functional kit and set of materials should be devised and provided to all the individual participant schools in the reform process If this is not feasible due to fiscal constraints it becomes essential to provide training to teachers in the development of low cost teaching aids, prior to launching the reform practice This is necessary to counteract one of the major problems discussed earlier on—lack of equipment/materials and meagre resources.

Given these inputs the stages envisaged are sequentially delineated below, *Stage 1· Exposure to the Model Lead Demonstration School*

The starting point in implementing identified reforms/changes at the classroom level is that teachers in one cluster visit the selected model school. This exposes them to a real life actual situation similar to their own, where the desired practices are in operation within limited infrastructures This would help in changing existing beliefs, negative attitudes and fear of participating in the change process.

Stage 2. Periodic Onsite School-based Training

After the above exposure the teachers should participate in a series (may be 3-4) short-term training workshops, organised in the lead demonstration school for a number of reasons:

1 training cycle is school-based/focussed making it more practical and viable, than the regular off-site models being implemented;
   - educational authorities at the block/district levels,
   - state/national through researches both qualitative and quantitative.

It is acknowledged that in this small scale study it was not possible to determine specific details regarding type of kit/materials to be supplied, exact period required for continuous training, profile of the coordinator amongst other important factors. These inputs would have definitely served to strengthen the overall metholology being presented Howerver, data collection on the areas mentioned was not the objective of the study The limitations however serve the useful purpose of indicating and highlighting the need and areas for intensive research, if the methodology being advocated is to be used in the future

CONCLUSION

School reform efforts in the past decade have not led to visible improved instructional practices at the level where it matters the most—the classroom; particularly in small size primary schools largely located in the remote inaccessible areas of the country catering to marginalised sections of the society.

This qualitative research study analysed teachers' perceptions as to general problems faced by them, as also specific to small size schools, and relevant strategies for resolving the same. What emerged had been formulated into a cohesive practical methodology based upon school community reflection, regular on-site demonstration school-based training, continuous peer group and facilitator support within identified clusters of schools It is hoped that this broad-based strategy would serve to encourage teachers to accept support and implement new classroom practices in tne future, thereby strengthening and promoting the quality of basic education in the country.

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Moving Towards Inclusive Education: An Innovative Teacher Training Experiment

Anupam Ahuja

The experiment involved training of the teacher educators (master trainers), implementation of the action research projects evolved for each of the participating institutions, and whole school approach with and without external intervention; and studying effect of the school practice on attitude of learners and their achievement It covered from the training of master trainers, through training of teachers to pupil learning Single group pre-test post-test design was used. It is a development action research project.

Findings indicate (a) that teacher educators and heads of school can be trained and motivated for action to change classroom practice, (b) the training design development training capabilities of the action research coordinators to train preservice and inservice teachers, (c) the significant difference between pre-test and post-test mean scores indicates change of attitude of teachers to learning and teaching (in the area of active learning and in one case negotiation of objectives), (d) the procedures for understanding the needs of inservice and preservice teachers during training was transferred to use in the classroom to understand pupil learning style and needs, (e) the pre-test feedback from children's classroom drawings resulted in the change of classroom organisation, (f) the significant difference between pre-test and post-test mean scores indicates change in the attitude of students towards learning (active learning), (g) the significant difference between pre-test and post-test scores on PPLT (Pupil Participation of Learning Teaching) supports results regarding the change of student attitude towards learning and teaching, (h) a significant outcome is the self learning by the head and the teachers to improve classroom and school practice without external intervention, (i) the action research project particularly in institutions where whole school approach was followed increased interaction among teachers and collaborative work, (j) working on the Action Research Project to improve classroom practice helped to institutionalise active learning approaches

It is beyond doubt that across the world many children do not receive adequate education, including large numbers who have disabilities. This is so despite the fact that it is now more than 40 years since the nations of the world, speaking through the Universal Declaration of Human Rights, asserted that "everyone has a right to education " In our country the last decade has been significant in educational developments for children with special needs Earlier the range of provisions for these children varied from exclusion, through minimal provision, to limited coverage in special or regular schools The health and social welfare systems were also inadequately developed.

Lately, however, it has been realised that inclusive schooling is not an alternative choice but is an inevitability if the dream of providing quality basic education to all children is to ever become a reality Proponents point to disappointing outcomes for students with disabilities in traditional special education programmes and to the growing body of literature describing favourable outcomes for exceptional students taught in the general education classroom (McGregor 1993). Inclusion can be defined as the practice of serving students with a full range of abilities and disabilities in the general education classroom It is described not as a place or a particular method of instruction, but rather a philosophy of supporting children in their learning, a philosophy that holds that all children can learn (Roach et al. 1995). This thus necessitates teacher education reform to ensure success with access to all children. An attempt has been made to develop design models in our sociocultural and economic context. Theoretically sound and practically feasible teacher development programmes are therefore the goal

The basic premise is that primary schools can meet educational needs of all children. It sounds rational since large number of communities in our country have access to only one school This school has to be responsive to educational needs of all children, if the goal of universal primary education is to be achieved and if all the children are to be enrolled. The diversity of their educational needs increases considerably in the classroom. It raises a number of questions *Can teacher accommodate pupils with diverse educational needs in the classroom? If they can, are they equipped for accomplishing this task? How should inclusive classrooms be created? How should teachers both general and special be trained and prepared for teaching in inclusive classrooms? What should be the content and process of such a training programme?*

Of the many initiatives taken towards meeting the needs of all children in the general school system the Project Integrated Education for Disabled Children (PIED), UNICEF assisted, begun in 1986 was seen as a significant breakthrough. The experience with PIED answered the first question We felt convinced that teachers can meet educational needs of all children in the classroom, provided they are trained for it, and it is accompanied by building curriculum flexibility alongwith adjustment and adaptation of learning material for children with special needs

Though the positive gains were obvious the evaluation of PIED also showed severe limitation. Despite an emphasis on integration, we found that categorisation, labelling and exclusion from activities continued. We also noticed that more school children were being identified as children with special needs. Were schools pushing more and more marginal children in order to match the funds being demanded and expanded? Also despite our efforts to make training of teachers learner-centred, the didactic component still continued to be on the higher side.

At this juncture the writer alongwith a senior colleague were invited to act as coordinators of the advisory team to review and select materials for the UNESCO project. The philosophy and approach seemed to be relevant to the issue arising out of our review of PIED. Our association over the past six years has been with the development and field testing of the UNESCO Teacher Education Resource Pack on Special Needs in the Classroom The writer has worked with the content and approaches of the pack both in India and in a number of developing countries. These experiences alongwith the training content and process in the PIED prompted us to plan the multi-site action research project to try our ideas in the field The style adopted in these trials bore many of the characteristics of action research as developed by Kurt Levin, with participants encouraged to work in teams, using "reflective thought, discussion, decision and action," in order to develop and refine the thinking and practice of the project (Adelman 1993) Central to all this is the preparation and support of teachers Consequently there is evidence of increased activity to upgrade the quality of pre and inservice teacher education internationally (Levin & Lockheed 1993). Thus the premise is that teacher development is the key to organise effective schools for all.

OBJECTIVES

Specific objectives of the multi-site action research project were:

- To conceptualise teacher development design for meeting educational needs of all children in the classroom
- To study the extent of transfer of teacher development gains to classroom practice
- To study the effect of the changed classroom practice on the learning and achievement of the learners

THE DESIGN

The experiment was comprehensive in nature since it involved training of the teacher educators (master trainers); implementation of the action research projects evolved for each of the participating institutions, and whole school approach with and without external intervention, and studying effect of the school practice on attitude of learners and their achievement It covers from the training of master trainers, through training of teachers to pupil learning. Single group pre-test post-test design was used. It was a development action research project.

DESCRIPTION OF THE EXPERIMENT

The project began with a training workshop held in Mysore in south India. Thirty-three coordinators from twenty-two institutions (9 District Institutes of Education and Training (DIETs), 8 Colleges of Education, 3 schools and 2 Non-Government organisations) from different parts of the country attended the workshop It was a mixed group of six heads of institutions, three teachers, and twenty-three teacher educators. The selection of participants was done in such a way that two persons form each institution were involved in the training. This was done in order to promote mutual support and collaboration. It also helped in providing procedural and resource support. Some teams consisted of the head of the institutions and a teacher educator or teacher, while others were represented by two teachers or teacher educator In the case of the latter, care was taken to see that the head of the institution was informed about the policy of the resource pack material to ensure full support.

TEACHER EDUCATION

The training was based on the Indian adaptation of the UNESCO Resource Pack material using active learning approaches. These approaches assume that the development of practice occurs in the main as a "trial and error" process through which teachers develop their repertoire of responses as a result of what seems to work for them. Their previous experiences as pupils may be very influential here in shaping this development process, plus their observations of other practitioners, including those who lecture to them in teacher education contexts In this way teachers create their own individual theories of teaching that guide their day-to-day practice These theories are largely unarticulated They represent the "tacit knowledge" that has been created through a mainly intuitive process of learning from experience.

Often teacher education appears to ignore or even deny the existence of this process of professional development Rather the process of becoming a competent teacher is characterised as being about acquiring knowledge about content areas (e.g., maths, science) and foundation subjects (e g., psychology, sociology), and then transferring this knowledge into ways of working in the classroom This transfer is seen as being the responsibility of the teacher, with teacher educators seeming to see this as being outside their own area of responsibility Michael Huberman (1993) describes this predominant approach to teacher development as "swimming against the tide." He argues that it would be more appropriate to recognise the reality of teacher's lives, including the processes through which their practice develops, by adopting approaches that build upon the way they carry out their work in the classroom. In this way teacher education activities can "swim with the tide."

Teachers and teacher educators, bring to their work strong beliefs about their roles, the nature of their practice, the ways in which children learn, the purposes of schooling and the needs of their students. Generally these beliefs are deeply held and are resistant to changes. Mitchell and Barron (1993) suggest that such beliefs represent a person's construction of social reality, whilst Abelson (1986) argues that if threatened they tend to increase in value. Meanwhile researchers continue to struggle with the problem of how to get people to discard particular beliefs and consider new possibilities for improvements in their practice (e.g., Fullan 1991) Clearly it is insufficient simply to show that a belief that is held is in some way limiting or unsatisfactory. In order to change, individuals need to be able to identify with others who have alternative beliefs and to feel that they are likely to gain more than they give up (Abelson 1986) They also need to feel some dissatisfaction with their existing beliefs and perceive the new propositions intelligible, plausible and fruitful Furthermore in order to bring about change they must be provided with a safe learning environment in which "they are comfortable in taking the risk of sharing themselves and engaging in public examination of deeply held beliefs and practice" (O'Loughlin 1992, p. 339).

Within the project an attempt was made to work in ways that are consistent with these arguments Specifically we tried to develop ways of working that can help teachers to become more confident and skilful in learning from experience. Rather than simply leaving this to chance we believe it is possible to create contexts that enable individuals to recognise the value of this form of learning and to gain greater control of the process involved In this respect we have been influenced strongly by Donald Schol (1983, 1987) His emphasis on "reflection-in-action" as an intuitive means of developing practice seems to be consistent with the argument that teacher development initiatives should swim with the tide. Specifically it recognises the ways in which teachers adapt their plans in the light of changing circumstances and pupil feedback, and, in so doing, experiment with minor alteration in their repertoires of responses

In emphasising the importance of reflection we tried to introduce teacher educators to ways of working that will influence their own practice, and in truth, the practice of the teacher they teach This it was believed would help in pointing the way towards forms of classroom practice that recognise that the learning experiences of each student is unique In this way we are helping teachers to recognise that a particular lesson is experienced differently by each member of the class in light of their previous experience, existing knowledge and understanding This perspective on learning, sometimes referred to as a constructivist view, assumes that people's perceptions, appreciations and beliefs are rooted in words of their own making that come to be ragarded as reality (Goodman 1978).

We have placed considerable emphasis on social processes in order to widen the resources available to individuals as they seek to develop their thinking and practice through the process of personal reflection. The aim was to encourage teachers to recognise the value of dialogue with others in order to gain better understanding and to see further possibilities for improvements in practice. In this respect "others" include colleagues, pupils, parents and, of course, teacher educators

All of these were seen as sources of inspiration and support that can be used to facilitate learning. In addition, they are all seen as offering alternative perspectives that can help individuals to interrogate their experience in ways that may suggest alternative possibilities for development

TEACHER TRAINING

Four days were devoted to training the participants for the use of the resource pack strategies based on the assumption discussed earlier. The Teacher Education Resource Pack on special needs is based on the five principles of effective learning, namely.

- Active Learning
- Negotiation of Objectives
- Demonstration, Practice and Feedback
- Continuous Evaluation
- Support.

The pack which contains study material sheets for organising learning activities and the course leaders' guide for organising training programmes was used in training. This training was followed by a day devoted to workshop debriefing An opportunity for participants to practice with feedback followed. The last two days were devoted to planning and finalisation of the action research projects to be carried out in each institution.

The training sessions were planned in such a manner that participants reflected upon their own thinking and practice with respect to ways in which they would respond to pupils' special educational needs. They also helped participants determine their own learning objectives within the general aim of the course and think about themselves as learners. In addition the participants considered the integration of children with special needs and its influencing factors. Some sessions allowed rich discussions based on sharing different experiences on ways of effective teaching and meeting individual needs in the classroom. The participants were also encouraged to reflect on the nature of the support that is available in their settings and how they could develop a supporting network. In particular, they were asked to keep a learning journal in which they could record their experiences during this project.

Action research project for the participating institutions were designed with a view to developing capabilities in teacher educators and institutions to encourage implementation of the innovative material and strategies, and to provide research evidence (Jangira, Ahuja 1991a).. The assumption was that these innovations, spread over a year and a half, would become a part of institutional practice (Jangira, Ahuja 1991b). It was also hoped that the participants would evolve into "change agents" to reform the teacher development process, thus making it responsive to how teaching can take account of all children in the classroom. Further these institutions can be used to provide resource support to others in order to facilitate similar initiatives (Jangira, Ahuja 1991c).

DATA COLLECTION

The action research followed a pre-test/post-test single research design. School children and teachers were selected randomly. For trustworthiness of the research the importance of learning together and seeking collaboration were stressed. Participants were also asked to describe their methods and the context of the research. Caution was to be exercised before making conclusions. Data were to be reported with examples. The need to triangulate different type of data from interviews, attitude scales, evaluation of proceedings, photograph, audio and video tapes was emphasised. It was also stressed that there was a need to keep colleagues informed, design a short-term pilot, seek collaboration, be open to reactions, be self-critical and have fun!

For the evaluation of the organisation and management of the training workshop, participants used a daily evaluation sheet, participant questionnaire, group reports, course leader and participants' learning journals, and observations. Course leaders were also asked to note specific reactions to sessions using structured methods such as, "stance taking" and "rounds"

For evaluating the effectiveness of the workshop, measures were adopted to observe changes in the teaching behaviour of teachers and children's feelings about learning and teaching in the classroom. This was done using the following specifically designed measures.

- Teacher Attitude towards Teaching and Learning
- Pupil Participation in Learning Teaching Inventory
- Classroom Drawings (teachers and children)
- Learning Preference Questionnaire
- Pre-test and post-test photographs of learners in learning activities

Teachers were also asked to observe and note changes in their instructional behaviour, and the attendance, achievement and attention span of children after the follow-up exercises carried out in classrooms.

MONITORING PROGRESS

A three-day project review meeting was organised to help participating terms share their experiences regarding planning, implementation and problems encountered This also helped participants in considering pretesting experiences, evaluation procedures, follow-up measures and discuss report writing format.

Later, in March 1993, a final evaluation conference took place By then almost all the institutions involved had finished their action research projects Their work involved a total of 338 experienced teachers, 248 preservice teachers; 9896 children, and 115 schools

In several cases, rural areas had been included in the project. Some institutions had involved state governments and local education department officials. School-based follow-up exercises had been planned and implemented. Some institutions obtained particularly encouraging results in teaching mathematics and science using the approach The material were translated into a variety of languages. Photograph had been taken and some project sites developed video programmes. All had actively maintained learning and course journals in order to record their experiences.

The whole school approach used in two schools was particularly effective. In these two schools teachers and heads were actively engaged in the action research activities. Recently one of them has been able to integrate blind children in their mainstream smoothly A significant innovation while using the whole school approach has been the use of the resource pack materials without an external change agent Here we found that staff have been involved collaboratively without any intervention

A few comments from members of the project teams engaged in training inservice and preservice and planning follow-up work with children in classrooms are given below

How They Feel?

- "Initially preservice teachers were unsure about planning a lesson However as they used the approach planning became effective and enjoyable " (DIET, Wayanad, Kerala)
- "Most subjects can be taught using this approach " (Amar Jyoti School, Delhi)
- "The approach was found effective in teaching English The method helped in generating a rich discussion It resulted in intermingling of boys and girls in the class " (DIET, Rajinder Nagar, Delhi)
- "Economical to teach with approach. It reduces teacher's work load and resulted in better time management " (Navyug School, Delhi)
- "In situations where it was difficult to organise group work (fixed or heavy furniture) conducting sessions outside the classroom worked well " (Seva-in-Action, Bangalore)
- "This approach helps to make learning more enjoyable " (DIET, Sonitpur, Assam)
- "For orientating the teacher training institute staff about the approach using the student teachers as model proved useful " (Regional College of Education, Bhubaneshwar)
- "Clearly administrative hurdles handled in stages helps to make the project as success " (DIET, Tirur, Tamilnadu)
- "When this approach is followed initially there is a resistance from the student However, over a period of time they accept it " (DIET, Sonitpur, Assam).

OUTCOMES

On the whole it seems that teachers and student teachers have few reservations in meeting special needs, if they are provided with appropriate training and support The materials and the process encourage them to be more reflective and better problem solvers not only for meeting the special needs of all children, but also for professional tasks relating to teaching and school organisation in general. It has also activated and motivated teachers and pupils to learn and take responsibility for their own learning. Writing a learning journal, reflecting on it and sharing with others seems to make teachers professionally alive This develops reflection and the problem solving capabilities of teachers, thus improving their effectiveness. Teachers also learn the utility of collaborative work teaching and organisation of schools

We have also found that the same spirit of collaboration is passed on to the pupils Encouraging independence in learning in students and teachers develops initiative in both. Teachers also realise that even within the rigidity of the Indian school system, reasonable autonomy in curriculum transaction can exist.

The major outcomes can be summarised as follows

- Teacher educators and heads of school can be trained and motivated for action research to change classroom practice.
- The training design developed training capabilities of the action research coordinators to train preservice and inservice teachers.
- The significant difference between pre-test and post-test mean scores indicates change of attitude of teachers to learning and teaching (in the area of active learning and in one case negotiation of objectives).
- The procedures for understanding the needs of inservice and preservice teachers during training was transferred to use in the classroom to understand pupil learning style and needs
- The pre-test feedback from children's classroom drawings resulted in the change of classroom organisation.
- The significant difference between pre-test and post-test mean scores indicates change in the attitude of students towards learning (active learning)
- The significant difference between pre-test and post-test scores on PPLT (Pupil Participation of Learning Teaching) supports results regarding the change of student attitude towards learning and teaching
- A significant outcome is the self learning by the head and the teachers to improve classroom and school practice without external intervention.
- The action research project particularly in institutions where whole school approach was followed increased interaction among teachers and collaborative work.
- Working on the Action Research Project to improve classroom practice helped to institutionalise active learning approach as evidenced from:

    (a) the expressed willingness to continue working with additional modules on effective classroom practices;
    (b) the desire to extend this approach to more schools through the action research funds of the DIETS;
    (c) willingness of teacher training institutions to use these approaches in inservice and preservice training approaches.

The multisite action research project is turning out to be a good reflective innovative approach to teacher development. As such it is leading us to new insights It is also developing the insights of the participating teachers and teacher educators In the process, a dozen resource persons who can provide effective training using the Resource Pack strategies, and design and implement similar action research projects have been identified These institutions will be used as resource centres for further work. Rich material well adapted to a variety of contexts in the country has been developed. New material applied to the teaching of school and teacher training syllabi is a significant contribution The goal of universalisation of primary education including children with special needs seems to be contingent on the teacher development initiative of this kind

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Application of Pedagogical Knowledge and Skills Acquired in Teacher Training to School Teaching by Primary School Teachers of Mathematics

Pushpa Verma and S. Chabra

The study examines the extent of familiarity with the skills, strategies and devices during the preservice teacher training; the extent to which they are able to employ the training competencies in their classroom practices; the competencies and approaches to teaching being popular among teachers; and the difficulties and limitations of teachers in using their pedagogical skills and competencies in actual teaching of mathematics

Questionnaire and interview techniques were used to get the data from the participating teachers.

The findings indicate that teachers have sufficient knowledge of subject matter and they did do initial preparation for the course in advance; teachers tend to use predominantly one or two teaching techniques namely, illustrations and problem skills; most of the home work, given by the teacher, originated from the assigned textbook, and is checked by teachers, majority of the teachers have been found to be having higher professional qualifications than required, which has led to the difficulties of handling all subjects by a single teacher

INTRODUCTION

Primary Education in India

Primary education in India after Independence has expanded enormously India has the largest number of primary schools in the world. There are nearly 577 thousand primary schools, enrolling more than 100 million children and employing 1.8 million teachers From 2.20 lacs in 1950-51 primary schools increased to 5 65 lacs in 1991-92 More than 95 per cent of rural population has a primary school within walking distance Though there was a massive quantitative expansion, the state of affairs is quite disappointing as drop-out rate at primary level was as high as 46.97 per cent in the eighties The rate for girls was still higher The drop-out rates for both scheduled castes and scheduled tribes were 67 73 per cent and 78 51 per cent respectively.

There are also disparities in access to primary education. Recent studies (Dave et al 1988; Govinda and Verghese 1993; Shukla 1994, Bashir et al. 1993; and Jangira 1994) have shown low level of learner achievement Besides poverty, socio-cultural traditions, taboos and political indifference, one of the important causes of drop-out is that children find school learning boring and irrelevant.

Moreover, the educational facilities are substandard. There are no play grounds, drinking water, separate urinals for girls and no educational aids.

Though there are spectacular improvements in the educational facilities in India, the target of Universalisation of Elementary Education (UEE) could not be achieved. A directive principle of the constitution of India adopted in 1950 was provision of free and compulsory education to all children until they complete the age of fourteen. The goal was to be achieved within the next ten years, that is, by 1960 In 1965-66, the target date was revised to 1975-76 The Kothari Commission (1966) suggested that UEE be achieved by 1986. The NPE envisaged that all children of nearly eleven years of age would have five years of schooling and by 1995, all children will be provided free and compulsory education upto fourteen years of age. The revised NPE (1992) laid emphasis on universal access and enrolment, universal retention of children up to fourteen years of age and a *substantial improvement in the quality of education* to enable all children to achieve the essential levels of learning The Programme of Action (1992) envisaged "free and compulsory" education *of quality* to all children of fourteen years of age by A D. 2000. In 1993, the supreme court judgement ensured free and compulsory education to all children up to the age of fourteen as a fundamental right

Mathematics in Primary School

Kothari Commission (1964-66) has pointed out, "We cannot over stress the importance of mathematics in relation to science education and research. This has always been so, but at no time has the significance of mathematics been greater than today. it is important that deliberate effort is made to place India on the "world map of mathematics within the next two decades or so."

Mathematics is now a cumpulsory subject up to secondary stage. An expert group was appointed by the Ministry of Human Resource Development (Ministry of Education and Social Welfare in 1973) to develop the curriculum for 10 + 2 pattern *The recommendations for curriculum in mathematics at the primary stage are:*

The child should be introduced to numbers, the fundamental operations on them and their elementary properties Concepts of length, weight, time, area and capacity should be developed along with the units of measuring these The child should gain familiarity with geometrical forms and figures and also with an elementary notion of algebraic symbols. Simple applications of the fundamental operations and arithmetical processes to everyday problems should find an important place at this stage. The amount of time to be devoted to teaching of mathematics at primary stage is recommended as· classes I and II—10 per cent of total school time, classes III and IV—15 per cent of total school time.[1]

Aims of primary school mathematics are·

1. Understanding of the meanings of elementary mathematical concepts, processes, principles and relationships.
2. Development of habits and skills in the processes resulting in accuracy and speed.
3. Application of the above concepts and skills to everyday life situations.
4. Appreciation of the value of numbers in individual and social situations.[2] There are utilitarian goals for every individual in the world today. But mathematics is also a tool for specialised occupations like engineering, architecture, computing, etc. So every student should have a basic course in mathematics covering the fundamentals as well as those topics which are essential background of mathematics at later stages.

Preservice Training of Primary Teachers

Teacher training is an essential qualification for professional placement of teachers in schools and more so it is of crucial importance at the primary stage of school education There is shortage of good teachers as far as supply and adequate training is concerned Educational expansion does not imply large number of students to be admitted. Equality of opportunity and quality is also important The World Conference on Education for All (Jomtien, March 1990) held that the need of developing countries is "basic education of good quality" National Policy on Education (1986) and revised National Policy on Education (1992) held, "it shall be ensured that free and compulsory education of satisfactory quality is provided to all children up to fourteen years of age before we enter the 21st century." The Education Commission had stated that "of all the factors that influence quality of education ..the quality, competence and character of teachers are undoubtedly the most significant."

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[1] [2]Aggarwal, S.M , *A Course in Teaching of Modern Mathematics*, Dhanpat Rai & Sons, Delhi, 1994

The number of primary teachers has risen from 3 44 lacs in 1947-48 to 16.39 lacs in 1991-92

During their preservice teachers training programmes, trainees are exposed to a variety of methods and techniques of teaching They are also given skills which are (1) Core skills such as formulation of instructional objectives, blackboard work, questioning skill, dramatising and so on (2) Specific skills necessary for teaching different subjects such as preparing teaching aids in a subject, skill of providing a variety of learning experiences through organising a drill or project work and so on Attention is also paid to specialised knowledge and skills with regard to content and methodology.

Teaching practice constitutes an integral part of teacher training programmes Pupil teachers are trained in preparing lesson plans and given opportunities for evaluating pupils' performance by preparing and conducting tests for the units they teach during teaching practice.

The curriculum followed by many teacher training institutions including District Institutes of Education and Training (DIETS) is provided by NCERT (1991).

Due to changes in policies on education, corresponding changes in teacher training curriculum are desirable This aspect has also received considerable attention in NPE (1986). Moreover, a large number of teachers may not have received any inservice training after becoming teachers

Mathematics Education at the Primary Level

Science and mathematics have become compulsory subjects of school education At the primary stage (I to V) the teacher teaches all subjects Not many of the teachers at the primary stage have the necessary background of the content as well as methodology. NPE (1986 with modifications, 1992) states, "Mathematics should be visualised as the vehicle to train a child to think, reason, analyse and to articulate logically. Apart from being a specific subject, it should be treated as a concomitant to any subject involving analysis and reasoning. With the recent introduction of computers in schools, educational computing and the emergence of learning through the understanding of cause-effect relationships and the interplay of variables, the teaching of mathematics will be suitably redesigned to bring it in line with modern technological device "

The demands placed upon elementary teachers of mathematics are related to both the mathematical content and the instructional procedures to be used in teaching mathematics to children. Elementary teachers must understand the ideas in mathematics programmes and employ appropriate procedures for introducing and developing these concepts

Teachers should realise that contemporary mathematical needs are quite different than they were in the past decades. New discoveries and developments in the fast developing scientific and technological era calls for uses of mathematics which were less known a few years ago. Schools are to help students fully develop their potential for mathematics and a solid foundation should be laid in at the elementary stage. At this level children must be helped to develop interest in and liking for mathematics

The teacher trainees are exposed to a variety of methods, techniques and skills during their training programmes which may help children gain insights in dealing with numbers; give meaning to rote responses, develop firm foundations for the later study of mathematical concepts emphasising on patterns, relationships and structure; stimulate interest and enjoyment in mathematics and encourage children of all levels of ability to better and greater achievement Contrary to this, it is generally assumed that mathematics is a hard subject and its learning is difficult for average children. Mathematics to many, has become dull and monotonous subject which adversely affects mathematical attitudes.

If pedagogical skills acquired during teacher training are properly understood and employed by primary school teachers in class teaching, both teachers and students will find the study of mathematics fascinating, challenging, satisfying and enjoyable No such claims are ever substantiated by objective studies nor any effort made to investigate if the teacher training skills are practised by teachers in their inservice professional duties and practices in the classroom. The present study (an IASE, Faculty of Education, Jamia Millia Islamia, New Delhi research project scheme funded by the MHRD) seeks to identify the extent to which the trainees have acquired to use them in the classroom practices. It also seeks to investigate limitations and reasons for their not being able to put to practice what the mathematics teachers learnt in their preservice teacher training programme. Dropping out on account of not interested in education especially in rural areas reflect how children are not motivated to learn and failure of teachers in retaining children in the school. Students cannot work creatively if learning is geared to an automatic response If children are asked to memorise facts and to drill on operational processes until they can repeat them by rote, mathematics will be something for children which is difficult to learn. According to Skemp," . children—or indeed, learners of any age—will not succeed in learning mathematics unless they are taught in ways which enables them to bring their intelligence, rather than rote learning, into use for their learning of mathematics."

Skemp quotes American professor of Mathematics, Dr. Hassler Whitney, *"For several decades, we have been seeing increasing failure in school mathematics education, in spite of intensive efforts in many directions to improve matters It should be very clear that we are missing something fundamental about the schooling process But we do not even seem to be sincerely interested in this, we push for excellence without regard for causes of failure or side effects of interventions; we try to cure symptoms in place of finding the underlying disease and we focus on the passing tests instead of meaningful goals."*

With all new developments in education, we do not want teachers adopting the form of the new methods and discarding some of the good aspects of the old. Drills are still important and should be replaced by skill based on understanding as the main achievement of the new methods

OBJECTIVES

1. To find out the extent to which the practising teachers of mathematics at the primary stage are familiar with the skills, strategies and devices learnt during their preservice teacher training programme
2. To find out the extent to which they are able to employ such teacher training competencies in teaching mathematics in their classroom teaching practice.
3. To investigate which of the competencies and approach to teaching mathematics are popular among the teachers.
4. To enquire into the difficulties and limitations of teacher in using their pedagogical skills and competencies in actual teaching of mathematics in order that teacher training programmes may receive feedback for its restructuring and relevance to teaching situations.

THE SAMPLE

It is a preliminary study based on a sample of 100 primary school teachers. Schools are selected on the basis of the representative sampling of schools in Delhi State keeping in view the rural urban area consideration to which they cater as well as the administrative zones in which they are placed.

METHODOLOGY

The questionnaire is the major device for collecting opinions on a wide ranging skills and competencies they have learnt and practised over the years of their professionalism Study of relevant research studies on teacher training and teacher competencies has been done Literature on Universalisation of Primary and Elementary Education as well as teachers support through the methodological and material development in elementary mathematics (MACESE) has been reviewed. The syllabi of the premier teacher training institutions for Primary and Elementary school teachers have been analysed in order to determine the pedagogical skills and competencies emphasised in the teacher training programmes Such institutions include the DIETS, Maulana Azad Centre for Elementary and Social Education, Delhi, Teacher Training Institute, Jamia Millia Islamia, New Delhi, Punjabi University, Patiala.

Micro teaching skills developed as innovations in certain areas have also been analysed and relevant competencies identified. The questionnaire is based on such theoretical ideas as gathered from these analyses and also feedback from a select sample. The questionnaire comprises of structured as well as semi structured and open ended questions covering a wide range of teacher training skills, competencies and device imparted during the preservice training at the Primary and Elementary stage. Interviews where ever needed with teachers of mathematics to clarify their responses were conducted. It is further refined by subjecting it to the scrutiny of certain teacher training faculty members in mathematics. Since the questionnaire is in English, the data was collected personally, clarifying those portions of the questionnaire in which teachers faced difficulties and problems.

ASSUMPTIONS

1 The sample size taken for this study is 100 persons.
2. All the persons in the sample size are mathematics teachers in different schools in Delhi
3. It is assumed that all the persons would have responded on the basis of their behaviour profile instead of their attitude patterns.
4 The administration of the questionnaire was done on a personal basis and individual instructions given to each teacher.
5 The teachers have answered the questions free of any environment pressures and are representative of individual opinions.
6. The sample size is large enough to be indicative in nature but does not comprise of enough queries for it to be statistically significant.

7 The persons involved in the study are aware that it is a pilot project in this field and it would require study to arrive at a comprehensive statistical analysis

8. The study does not intend to conclude this pilot report but rather begin a new chapter so as to enable persons to evaluating in the future to have a new direction.

9 The qualitative and quantitative parts have to be read together in this report for a better understanding of the evaluations done during this study.

QUALITATIVE ANALYSIS

Some basic notes:

Average age of the Teachers· 36 years
Average experience of each teacher: 16 years
Lowest qualification: 10 + 2
Highest qualification: Postgraduation
Accuracy of response: 81%

MAJOR FINDINGS AND RECOMMENDATIONS

It was noticed during the analysis that teachers with better qualification had a better response pattern than teachers with a lower degree.

The following observations were made.

1 All teachers concluded that they had sufficient knowledge of the subject (mathematics).

2. All teachers did an initial preparation for the course in advance.

3. The objective of teaching was maintained as all teachers responded with a conclusive "yes" to this question. The worrying factor that remains is the fact that not many could correctly identify the objectives in exact behavioural terms. The conclusion that has been drawn here is the fact that specific inputs are required during teacher training for teachers to correctly identify the behavioural objectives of teaching mathematics.

4. It was noticed that all teachers did analyse the course contents

5. While analysing the methods of teaching used by teachers it was noticed that problem solving, play way and inductive and deductive techniques were used most extensively. Project work, laboratory and auto instruction were the least utilised. The restrictive way in which education is being imparted is a relevant point to be considered as all techniques were assumed to be equally important as teaching tools by the researcher. It was also noticed that none of the teachers could come up with new methods of teaching beyond those indicated.

6. Similarly it was observed that the responses indicating the frequency of usage (teaching techniques) usually hovered around one or two techniques being used predominantly.

7 On the micro teaching level in terms of skills and competencies of the teachers the observation was that the teachers are either not aware of all the techniques or the skills are not being fully utilised as the method of teaching is only restricted to the use of one or two techniques

8. Illustrations and applications and problem skills were the two teaching techniques used most often while dramatisation and audio visual aids featured as the techniques least used.

9. Teachers with a higher level of education seem to improvise more than teachers with a lower qualification who tend to restrict themseives to their known skills.

10. All teachers tend to give homework on a daily basis.

11. Most of this homework was given from the assigned textbook and rarely does the teacher venture out to other sources

12. The homework in general terms is checked often by teacher.

13. There was no clear consensus by the teachers on the use of diagnostic tools for assessment of the pupil's learning capabilities as the responses were varied.

14. Suggestions given by the teachers for remedial action to improve the present state of affairs did not indicate any concrete line of action even though some of the suggestions were good.

15. Most teachers indicated that they did not use any material except the textbook for teaching

16 When asked to suggest improvements in the syllabus, again the response was low.

17. Most teachers agreed that the present syllabus was good but could not site particular strengths and weaknesses in the syllabus.

18. All teachers could give examples for mathematics as a tool for developing reasoning imagination

19. In general most teachers found teaching mathematics interesting and absorbing

20 Creativity and imagination was sighted as the most important tools to develop interest in the pupil for mathematics.

21. All teachers agreed that teacher training had helped them to enhance their skills but not many could specially point to the micro level skills that it had helped them develop.

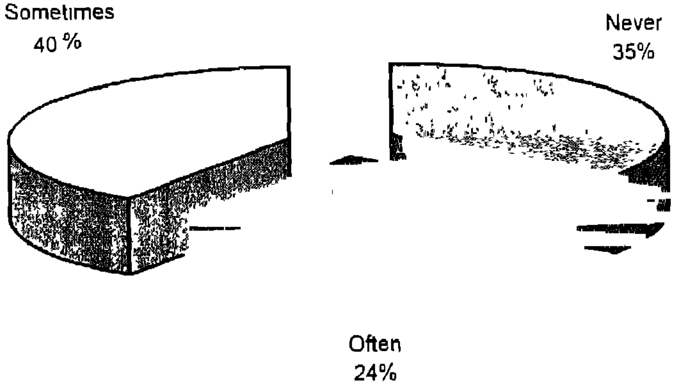
22. It must be noted as a footnote that the questionnaire was in English and some teachers had problems in answering some of the questions due to the lack of comprehension.

23. Contradictions were noticed in some cases which might have skewed the evaluation process.

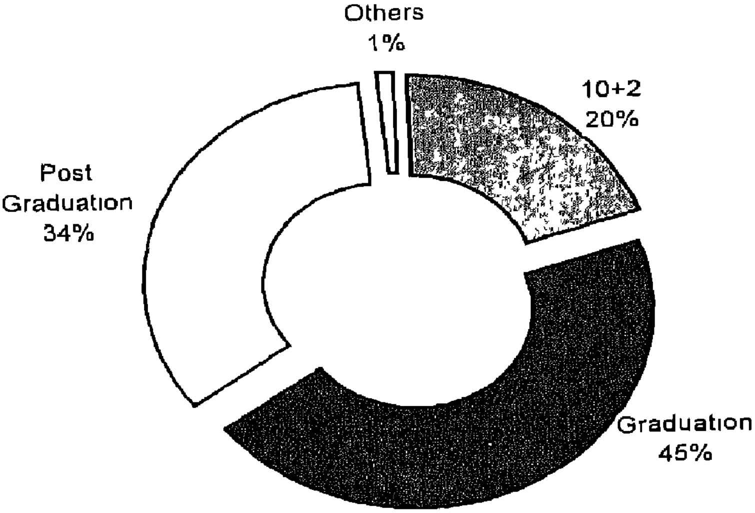
CONCLUSION

The report concludes on that the pilot study done on the skills accruired during the teacher training and the usage differ greatly. In general the teachers lack the full quorum of skills required to make them fully involved instructors. The whole process of learning may have to be redefined at the teacher training level and the syllabus level to achieve higher levels of learning in schools The schools are in a dire need of a *paradigm shift* as the whole process seems to have become rigid and monotonous. Most skills mentioned at the micro level in the questionnaire were not responded to satisfactorily This could indicate either the lack of knowledge of these skills or the under utilisation of these skills due to the rigidity of the system.

The researcher strongly recommends that education process be reviewed in light of these findings and changes made to the systems at both the micro and macro levels These changes have to be particularly directed at the training level of teachers to impart new skills and encourage the usage of these skills as would be applicable in an open school system



Improvisation of teaching aids



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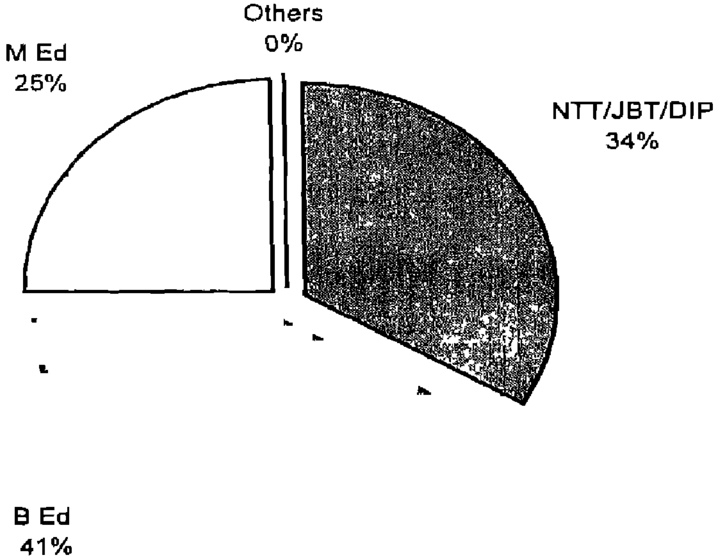

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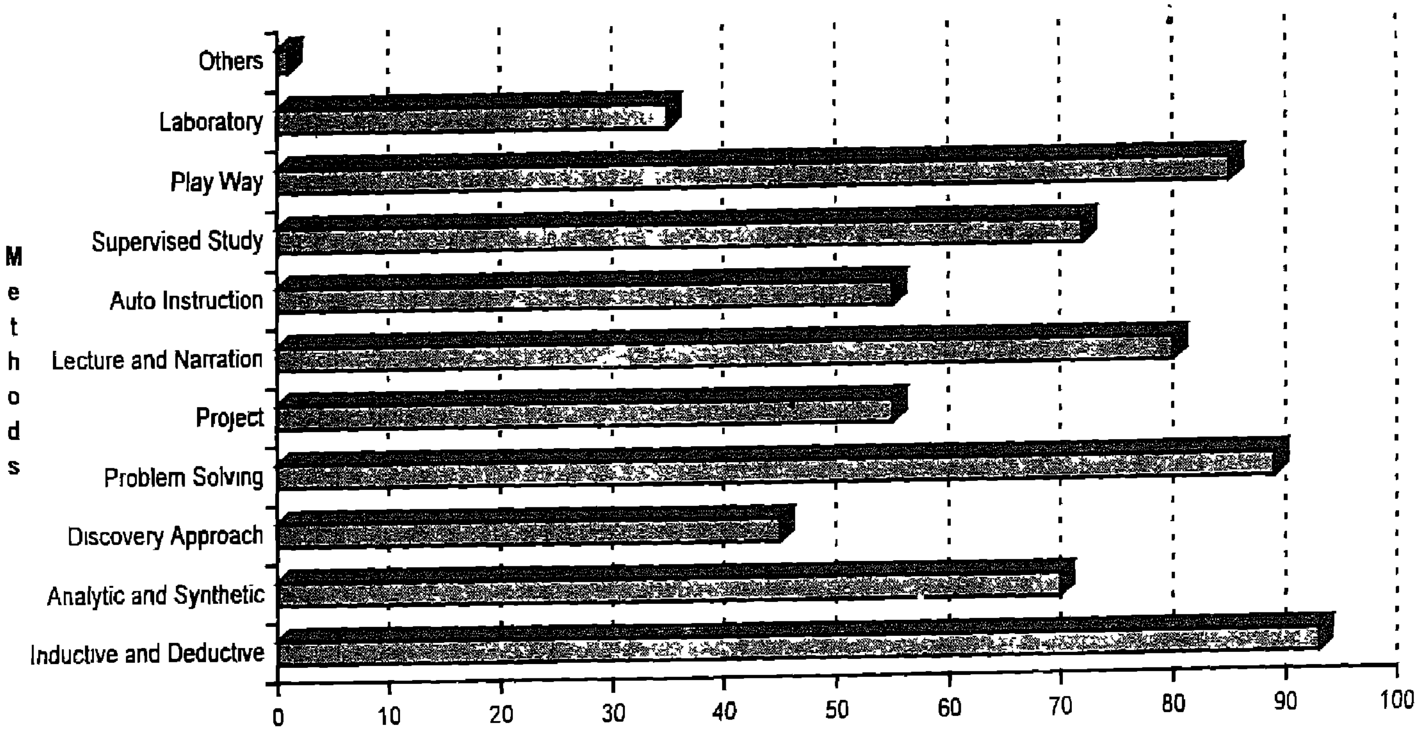

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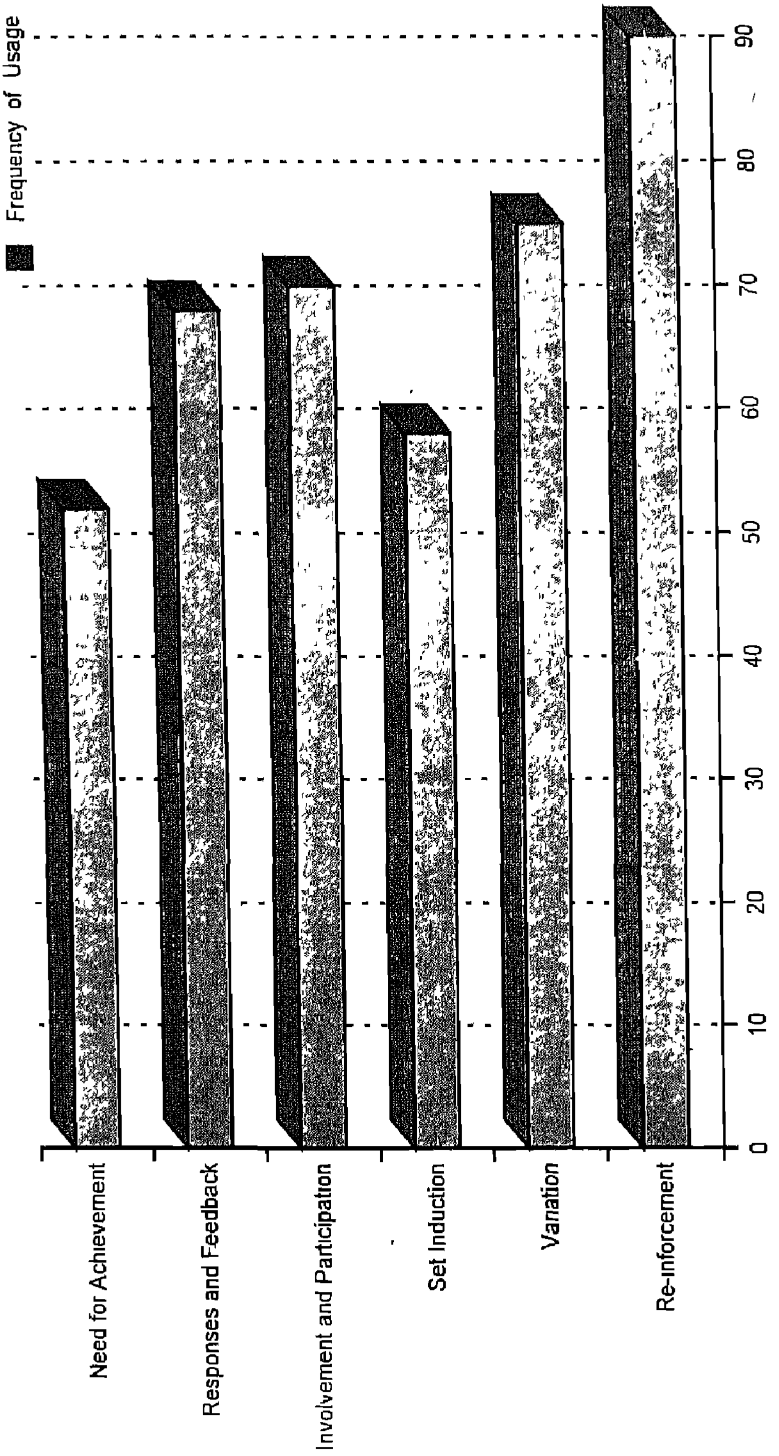
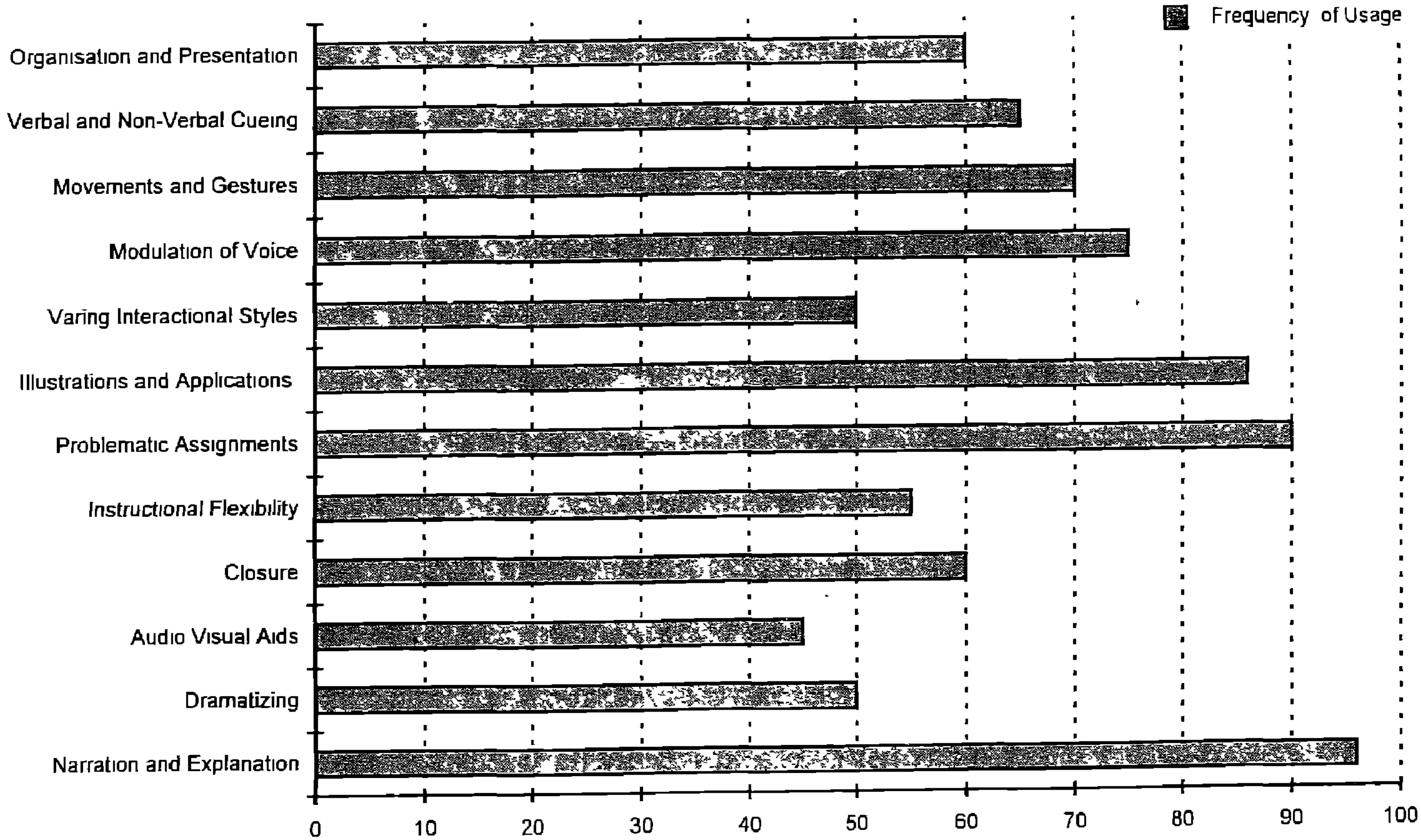
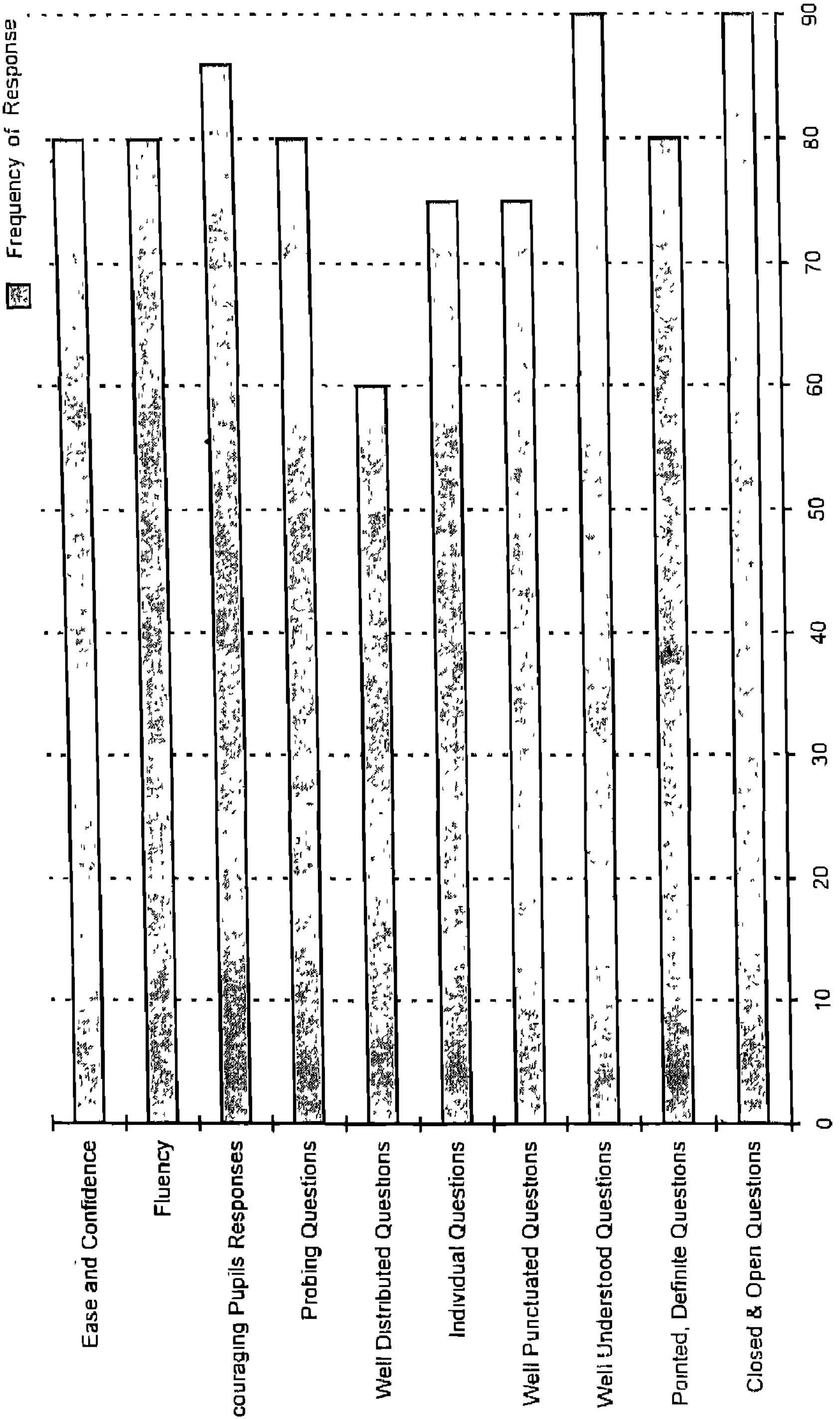


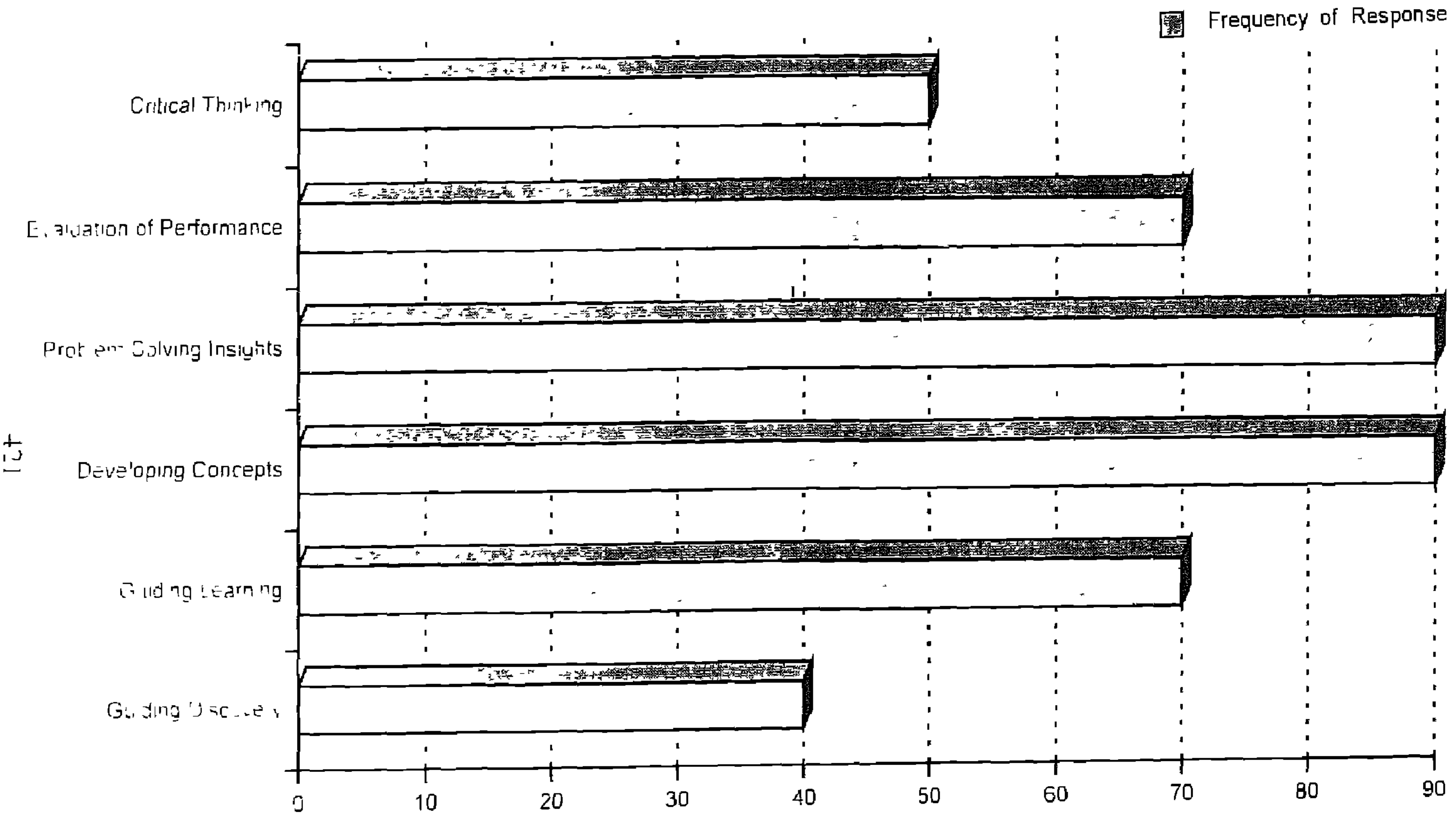
Motivational micro-teaching techniques



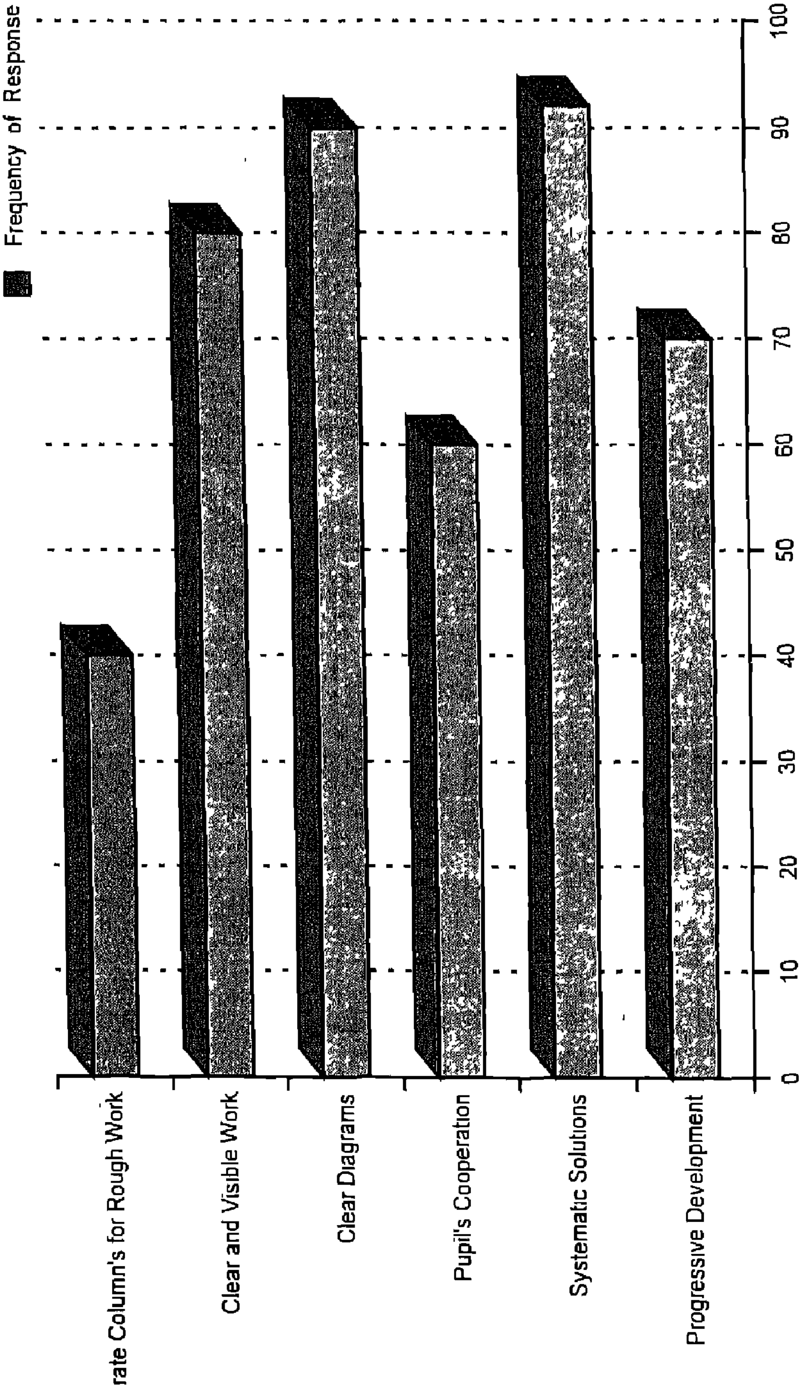
Presentation and communication — Micro-teaching techniques



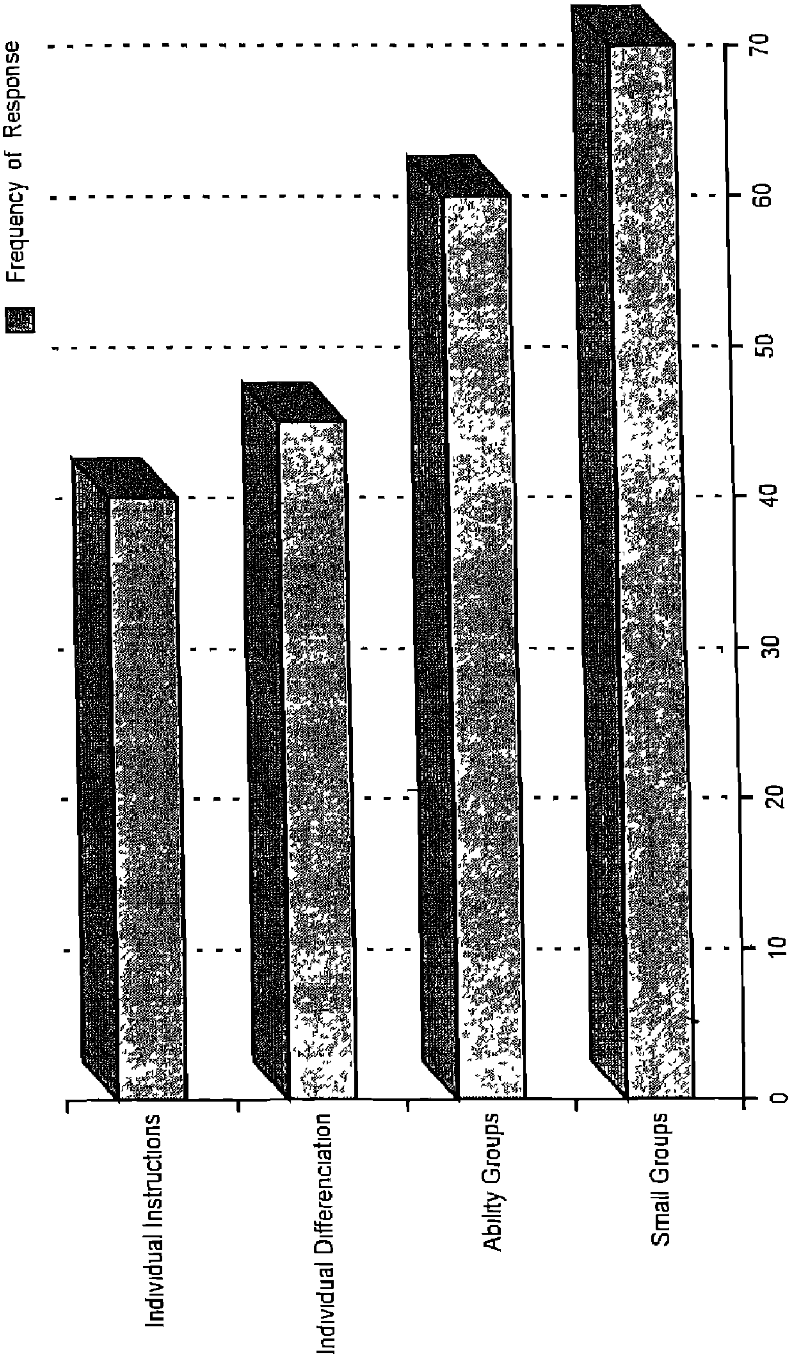
Effective questioning — Micro-teaching techniques



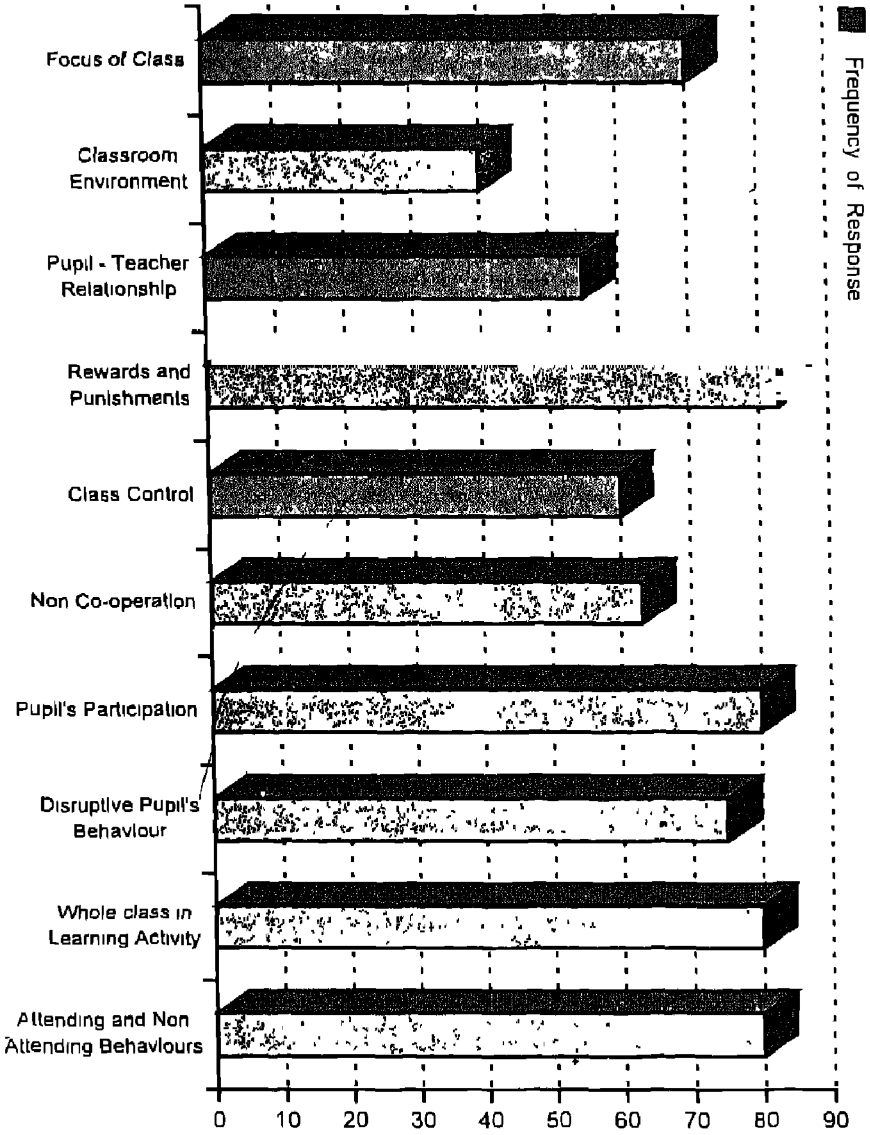
Developing pupil's thinking — Micro-teaching techniques



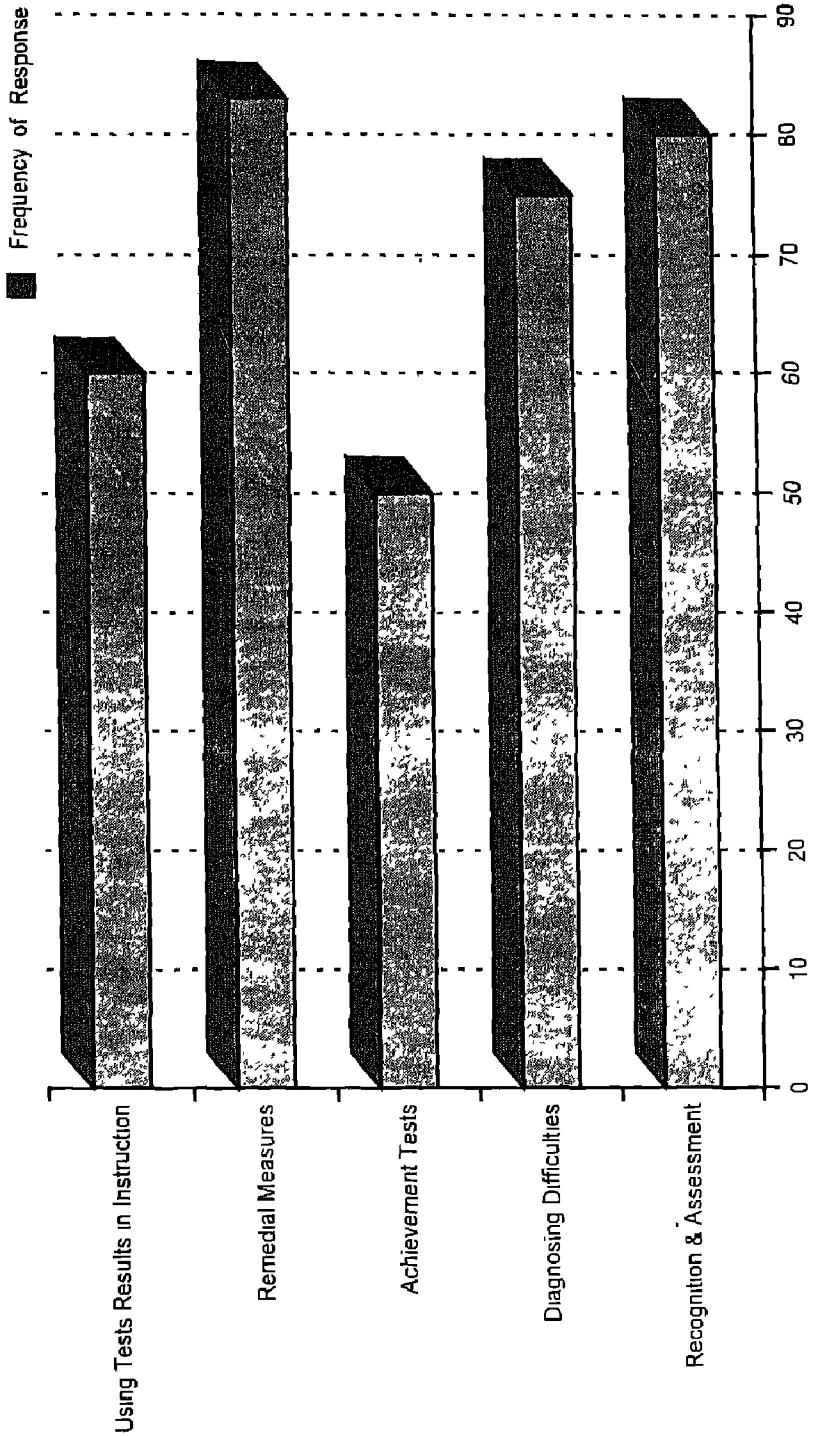
Educative use of blackboard — Micro-teaching techniques



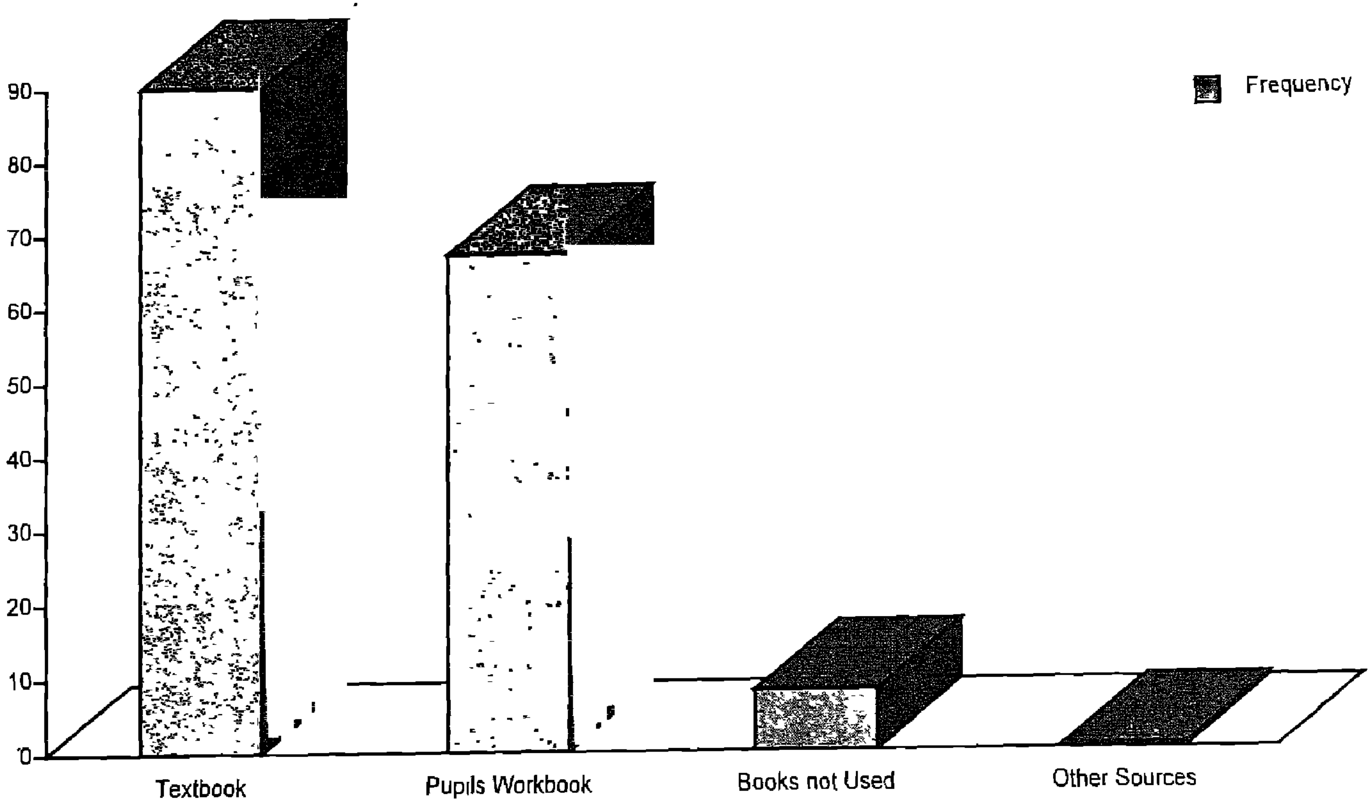
Organising learning groups, ability-wise — Micro-teaching techniques



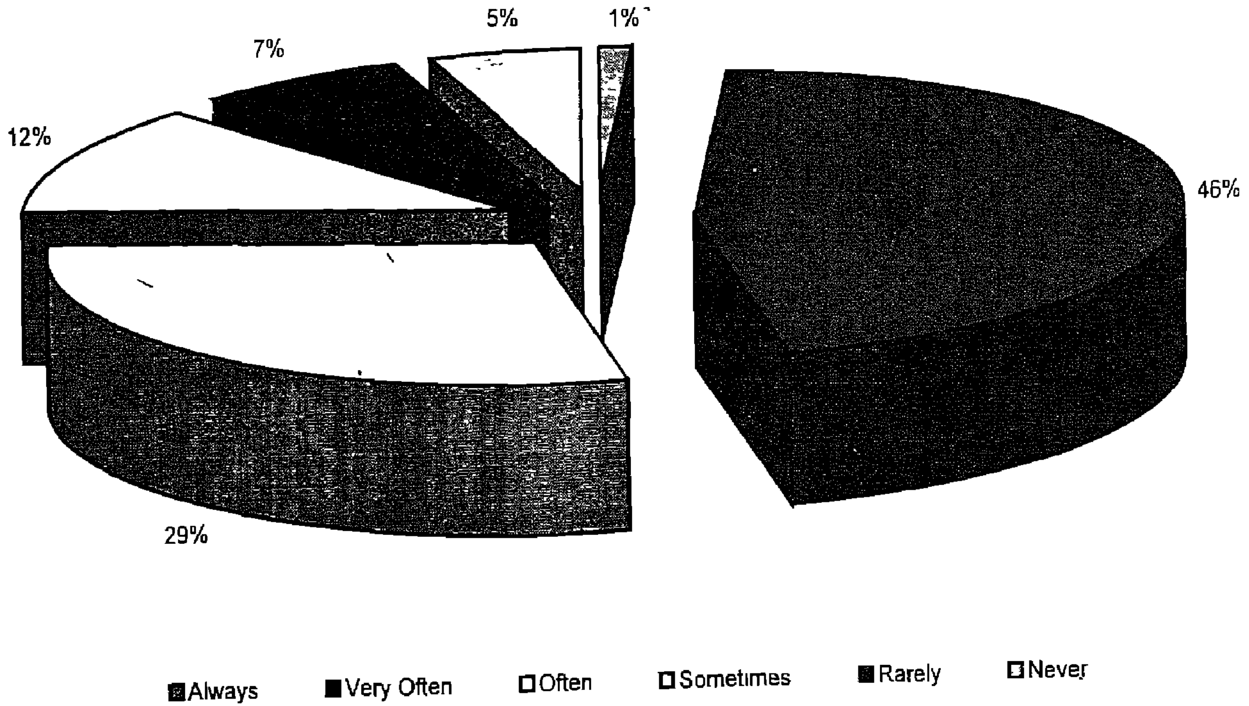
Class management and discipline —
Micro-teaching techniques



Evaluation of pupil's skills — Micro-teaching techniques



Homework assignment analysis



Homework Assignment Analysis — How often are assignments checked

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Instructional Practice and Classroom Management in Large Size Classes at Primary Stage

G. L. Arora and Pranati Panda

The study aims at (a) critical appraisal of research findings to understand the effect of class size on classroom behaviour and achievement of students, and (b) to suggest some effective instructional strategies for large size classes

Researches pertaining to class size and its relation to instructional practices and pupil behaviour and achievement were reviewed and trends as to how class size effects teaching and learning processes, were analysed.

Review of studies indicated that small classes are to be preferred over large classes Studies also show size effect upon promotion, pupil withdrawals, pupil conduct and classroom management. The attitudes, self-concept and motivation are also hampered by large size classes. Situation in India calls for a new approach and fresh thinking for planning instructional transaction. New instructional strategies like Peer Dyads (involving peers to assist the target students), peer group-work where students having common interests and ability level form into a group, monitoral assistance, participative or cooperative methods of teaching have been suggested.

The new strategies suggested for handling large size classes can help improve the quality of education at primary stage. These strategies would help to achieve UEE at a faster pace, reduce drop-out rate and improve pupil achievement The study provides alternative approaches for planning and developing new strategies for large size classes in the Indian set-up which enhance attendance rate and ensure quality in teaching and learning at primary stage.

INTRODUCTION

The long cherished goal of Universal Elementary Educcation has eluded us in spite of impressive expansion of educational facilities during the post-Independence period. The number of primary schools has increased from 209.7 thousands in 1950-51 to 575 1 thousands in 1993-94 while the enrolment of children increased from 13 8 million to 97 7 during the same period (MHRD Educational Statics, NCERT Sixth All India Educational Survey). Although the number of school-going children has witnessed an eightfold increase in absolute numbers, yet the number of out of school children in the age group 6-11 is a matter of great concern in spite of manifold increase in the number of schools and teachers. The drop-out rate at the primary stage is still more than 40 per cent

The failure to achieve the target of Universal Elementary Education can be attributed to the rampant poverty in rural areas, tribal areas, hilly and remote areas and also among disadvantaged sections of the society like Scheduled Castes, Scheduled Tribes and educationally backward minorities. This may be true to a considerable extent but this is not the sufficient reason of our failure to achieve the goal of UEE Poor quality of education imparted in unattractive educational settings is equally responsible for pushing the children out of schools. This view is supported by the data pertaining to enrolment in class I in different parts of the country which indicate that more than 90 per cent children in the age group 6-11 get themselves enrolled in class I. While analysing the problem of academic burden on children, Prof Yashpal Committee (1993) stated that the burden of non-comprehension creates more serious problem than the simple physical load of school bag The National Levels of Learning at Primary Stage (1990) made a case for development of various competencies among children at mastery level. The fragile learning which takes place in the absence of mastery learning prepares ground for pushing the child out of the school. A variety of reason are responsible for non-comprehension or fragile learning such as inadequacies among teachers, non-availability of appropriate infrastructural facilities in schools, poor socio-economic background of parents, irrelevant and ambitious curriculum and uninspiring school administration and classroom management.

Non-availability of adequate resource coupled with pressures of increasing enrolment has led to increase in teacher pupil ratio during the past few decades, which has led to emergence of the phenomenon of large size classes in many parts of the country, specially in urban areas. The class size index is consistently increasing as is evident from the Sixth Educational Survey (NCERT). The pupil-teacher ratio at the primary stage at the National level is 44.1 while in case of states and union territories, it ranges from as low as 15 in Sikkim to 61 in Gujarat. The rigid post fixation norms, non-availability of adequate space in the existing school buildings, non-availability of teachers in adequate number, absence of budgetary provisions for civil works and recruitment of additional teachers are some of the factors responsible for its emergence. It is a matter of common knowledge that in bigger cities like Delhi and Bombay, many school are under tremendous pressure to accommodate students much beyond the capacity of their buildings The abnormal class size may lead to a variety of problems, both for teachers and students, such as problem of discipline and curriculum transaction. It may have some effect on pupil achievement, pupil behaviour and school effectiveness The class size related issues like the ones mentioned above have been researched in different parts of the globe. An attempt is being made here to present the findings of some important studies.

RESEARCH EVIDENCE ON LARGE SIZE CLASSES

The effect of class size on achievement has always been a subject of controversy Glass and Smith (1979) undertook an extensive meta analysis of class size research and concluded that reduced class size can be expected to produce increased academic achievement.

Robinson and Wittebols (1986) concluded on the basis of integration of a large number of empirical studies that smaller classes are important to increase pupil achievement in reading and mathematics in early primary grades and pupils with lower academic ability tend to benefit more from smaller classes than do pupils with average ability. Salvin's (1989) review of eight well designed studies led to the conclusion that reduction in the class size results in production benefits for children Finn and Achilles (1990) conducted a large scale experiment which revealed that a significant benefit accrues to students in reduced size classes in reading and mathematics. The study also revealed that minority students, in particular, benefit from the smaller class environment especially when curriculum based tests were used as the learning criteria

Dececoo (1964) found that students in the small classes were slightly more favourably inclined towards the course, the instructor and subject than in the large classes. The class size affects pupil attitudes, either as a function of better performance or by contributing to it. In smaller classes the pupils are more interested in learning perhaps owing to less disturbance, less apathy, friction and distraction.

Results of the CSIP field study (Cahen et al, 1981) supported that student attention rates increases as class size becomes smaller. Students were found to be more attentive while participating in group lesson or when the teacher comes around to check on them during work period. Glass (1982) have frame favoured small size classes by observing that smaller was better and the smallest possible was the best of all.

Smith and Glass (1980) examined the question of class size and its relation to instructional practices and found that class size affects the quality of the classroom environment. In a smaller class there were more opportunities to adapt learning programmes to the need of the individuals. The climate in small classes was more friendly and conducive to learning. Class size affects teachers too. In small classes, their morale is better, they like their pupils better and are more satisfied with their performance In terms of pupils' attitudes, interests, motivation; the teachers' morale, satisfaction, attitudes towards pupils and in terms of the instructional environment, small classes are superior.

Teachers in the Class Size Instructional Practice (CSIP) study (1981) also found that lesson proceeded more smoothly in the smaller classes and for this reason they were able to cover more materials During work, they were better able to monitor the students' work and had more time for non-academic contacts with students. Instruction, learning, school climate generally improved when teachers work with fewer rather than more students. Quie (1982) concluded that teacher get better job satisfaction in teaching large size classes.

Effective management of the class is *sine qua non* for sustaining child's interest in the class and for higher achievement. It is only when the classroom is properly managed, when the teacher is master of the appropriate skills and techniques, that proper teaching and learning and any worthwhile relationship between teacher and pupils can take place (Smith 1985). Large size classes affect the proper classroom management as the teacher has to handle more number of students. Doyle (1970) stated, few would dispute that other things being equal, a large class poses a more difficult management problem than a small one. When the room itself is crowded, it further aggravates the management problem in teacher interaction, distribution of the materials sharing of equipments, maintaining record. The more students there are in the class, the more difficult it is for teacher to monitor behaviour and maintain discipline. Kounin (1970) revealed, as class size increases, some students will be lost in the crowd, inattentive and unnoticed which result in classroom absenteeism and dropout. In large size classes students may be inattentive while the teacher is busy in other work. The teacher in the CSIP study agreed that small classes have fewer discipline problems. CSIP study emphasised that in small size classes, the self esteem of the students were raised: school attendance also improved. Cahen et al. (1981) concluded that the pride and self esteem of students and school attendance improved in the small size classes. Smith and Glass (1980) revealed in their meta analyses that class size affects pupils attitudes, either as a function of better performance or contributing to it. Perhaps there is less distraction apathy and frustration.

·The studies reported above have shown that small size class is associated with better pupil attainment, higher level of self esteem and high morale among pupils as well as teachers. However, a few studies have demonstrated that large size classes do have some advantages over small sizes classes Ross (1983) states that large group teacher directed instruction is superior to individualised instruction Students tend, at least to achieve higher than they would in an individualised format or through discovery approach (P L Peterson and H.J Walby 1979) Large group teacher directed instruction tends to provide greater achievement in basic skills as measured by standardised tests, than do alternative approaches Ross, thus concluded that research on teacher effectiveness has demolished some beliefs regarding large size classes and we need not necessarily condemn large size classes which are inevitable today Quoting various research studies, Ross (1983) stated that it was wrong to think that the individualised instruction was always the best Large group teacher directed instruction is superior to individualised instruction or discovery approach when the basic skills are in focus while teaching less successful students

Glass V Gen et al (1982) who have done an extensive meta analysis of 77 empirical research studies over 80 years (1900-1979) on class size and its relationship to achievement, have found that 60 per cent of the studies favoured the smaller class. Jamison (1982) has argued that 40 per cent of the class size comparisons that were examined had failed to show an advantage for the smaller class and therefore it was not necessary to have smaller classes in schools He further stated that instead of reducing the class size, other alternatives should be adopted for improving school quality such as increasing the school time and using educational technology for effective teaching learning.

Singhal (1988) reported that out of total sample of school teachers who responded to the questionnaire in his study 52.63 per cent teachers feel that classsize is an important criteria for effective teaching, whereas 47 3 per cent do not consider it so. Majority of the teachers stated that the technique of teaching is more important than the class size. Hence teacher effectiveness is more a result of innovative methods of teaching learning, teaching aids and new technology than of class size.

The studies surveyed in the present paper have revealed that there is wide disagreement in the findings of the research on class-size issues At the elementary school level the evidence from research indicates that small classes are to be preferred over large classes, although no clear cut results are available Few studies indicate the class size effect upon promotion rates, pupil withdrawals, pupil conduct and classroom management. There are conflicting results with regard to relationship between class size and achievement of pupils. The studies of developed countries have supported small size classes The affective outcomes more closely related to class size than are the cognitive outcomes of schooling The attitudes self concept and motivation are also hampered in large size classes and the same gets boost-up in small classes as is evident from research findings The results of some experiments have indicated that with the use of typical teaching techniques, measurable pupil achievement is not adversely affected by reasonably large classes. A number of experiments have indicated the provision of and freedom from routine and clerical duties as.a precondition to effective teaching. Most teachers are found to be quite willing to assume greater pupil load if such aids were forthcoming. Studies also indicated that teachers of large classes are more lacking in adequate knowledge of individual pupils than are teachers of small classes. Few experiments revealed that teachers find large class instruction more stimulating Few studies also indicated that teachers morale, job satisfaction and instructional processes were greatly affected by the class size

Although large size classes seem to be very unmanageable yet the situation calls for new thinking, fresh approach for planning and developing new strategies for instructional transaction. There are several restrictions on the possibility of class size reduction. Although the costs attached to appointment of new teachers are prohibitive, yet there is no escape from quantitative expansion Reducing the class size in the present circumstances does not seem to be feasible, what is required therefore, is adoption of non-conventional approaches, techniques and strategies so that the quality of education is not adversely affected. The teaching techniques and the quality of teachers are more important than the class size for the purpose of achieving quality education Various strategies have to be evolved for optimising the large size classes. These strategies would help to achieve UEE at a faster pace, reduce drop-out rate, and improve pupil achievement.

ALTERNATIVE STRATEGIES

Effective instructional practice and class management of a class has today assumed great significance in a country like India where class size is constantly increasing The alternative strategies, methodology and the nature of instructional material would differ from subject to subject—and even in the context of the different topics of the same subject in the large size classes. The use of teacher facilitated/student led groups as an effective management technique has been suggested for large size classes. The following are some of the widely used variations of this techniques.

PEER DYADS

Involving peers to assist the target students to be successful in school has been implemented through various formats in the formal education practice. Research has clearly demonstrated effectiveness of peer dyads (King 1982) as a method of teaching academic content and as a means for enhancing appropriate behaviour in the general classroom Peer tutoring group may take forms, however the typical peer tutoring form consists of a more capable student teaching less capable Stoddard and Pike (1990) reported that the implementation of the peer programme reduced teacher disruption time taken to monitor pupil behaviour The academic and social benefits of peer tutoring have been clearly demonstrated in various setting.

PEER GROUP WORK

In peer grouping, groups are formed by different ability children. Peer group teacher is chosen by the group from within the group Any one who excels in a particular field becomes leader of the particular group for activities in that field The peer group strategy helps, in sustaining interest of learners It helps the learners to progress at their own pace and seek immediate help for their learning problems.

MONITORIAL ASSISTANCE

In large size classes, the monitor facilitates the teacher in the classwork, and in miscellaneous activities like coordinating and organising peer group and individual learning activities and to maintain discipline and minimise interruptions To facilitate teachers in large size classes, there should be different monitors for different subjects and also for different group activities.

COOPERATIVE LEARNING STRATEGIES

Keeping in view the drawbacks of the most commonly used presentation-cum-recitation method, cooperative methods of teaching and learning have been advocated by some educationists. The methods are based on the premise that occasionally teaching and learning should also take place in small groups where different members of the groups may get an opportunity to help each other. These methods involve interactive mode of teaching and learning which is based on the assumption that each one can teach others as well as learn from others

Cooperative methods are based on the assumption that the students will imbibe the value of cooperation if they are provided opportunities to work in small groups and bright student will help other member of the groups in learning the subject matter. Even the weak students will shed their shyness and participate in class work freely. It also involves interaction between students and teachers on the one hand and among students themselves on the other Therefore, these will break the monotony of traditional presentations-cum-communication method The cooperative methods have the potential to develop the independent and creative thinking abilities because these methods make use of techniques like discussion and group investigation. The students taught through cooperative methods will show higher scholastic achievement when compared with students taught through recitation-cum-presentation method which involves whole class format. ,

The following techniques are variations of cooperative learning strategies. Group Investigation Method (GIM), Teacher Presentation Students Revision (TPSR), Group Project Work (GPW), Student Team Achievement Divisions (STAD), Cooperative Integrated Reading and Comprehension (CIRC), Team Assisted Individualisation (TAI) have proved effective as cooperative learning strategies as a means for teaching students social interaction skills, increasing self esteem, and providing acceptance in the classroom for a more diverse population of students.

The success of these methods will depend on a variety of factors such as judicious formation of groups, teachers' ability to keep himself in the background, teacher's faith in the desirability and utility of these methods and students' enthusiasm to learn through self efforts However, it is not essential that each and every lesson should be taught through these procedures. Teachers will do well to make occasional use of these methods.

All these alternative strategies may be frequently used in the very large size classes but few strategies need experimentation in both urban and rural areas.

NEEDED RESEARCH

In the context of the current national priority of universalisation of elementary education, improvement in quality of education, improvement in quality of education is emerging as a major concern. The increased teacher-pupil ratio (class size) calls for new thinking and fresh approach for planning and developing new strategies for large size classes. With this end in view, it is proposed to make a humble attempt to undertake a study of classroom instructional practices and classroom management techniques adopted by the teachers in large size classes in the primary sector. The source of the study will be data collected from different large size classes of MCD primary schools. The sample of the study will comprise 50 teachers teaching 25 large size classes. A questionnaire is prepared on different components of class-room and instructional practices and techniques of classroom management followed by the teachers teaching large size classes They study will provide information about different approaches followed by the teachers handling large size classes in a metropolitan city like Delhi. It is further proposed to compare the learning achievements of pupils taught by through different techniques. In the second phase, comparative effectiveness of different teaching learning strategies/suitable for large size classes shall be assessed by following an experimental design. The outcomes of the research may prove helpful in introducing some new pedagogical approaches of teaching like teacher facilitated and student led groups like cooperative learning strategies, self managed-small groups personalised teaching learning strategies The study will help to determine the extent to which these kinds of activities can be used successfully in large size classes

It is expected that adoption of certain strategies for handling large size classes would definitely help in reducing drop-out rate, enhancing attendance rate and ensure quality education for all These strategies shall also help to cope with the pressure of numbers while ensuring quality in teaching and learning. There is a need to take a positive view which would embrace not only the pedagogical improvement but also curriculum changes and infrastructural facilities. The points need to be made loud and clear that if the students are to be taught effectively and to learn optimally in large size classes, they require individual and personal attention. Some pedagogical approaches of teaching like cooperative learning strategies, self managed small group-personalised teaching learning can be attempted by teachers in large size classes to make teaching learning more effective and conducive

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Teacher Self-efficacy and Competence for Improving Quality of Primary Schooling

Sushila Singhal and Rita Sharma

The study examines the effect of training teachers into achieving subject specific competencies in the primary classes on their self-efficacy and competence It was believed that such training would help in developing higher self-efficacy and competence among the teachers

The results provide positive support to the hypothesis of higher self-efficacy and competence of trained primary school teachers The two variables, namely self-efficacy and competence were observed to be significant, and both were positively related to performance. Among background factors only a few significant relations with self efficacy and competence were observed

The implications of the study are that (a) certain minimum operational conditions have to be ensured to the teachers, without which skill does not get converted into action and performance, and (b) training should focus alongwith the development of subject specific competencies The training should facilitate the teachers' acquisition of a comprehensive understanding of the complex task attributed and how to exercise control on tasks and the context. Only then the training would help in improving the quality of schooling.

It is pointed out that in order to judge the effectiveness of a training programme, its quality and content as well as expectations and attitudes of the teachers toward the programme should also be carefully examined

The National Policy on Education (1986) and the two Programme of Action documents (1986, 1990) envisaged improvement in the quality of primary schooling by training the teachers into achieving Minimum Levels of Learning (MLL) in specific subjects taught at the school. The MHRD committee (1990) specified MLL as the expected learning outcomes, the terminal behaviour which could be observed in terms of the learning competencies mastered by every child at the end of a particular class It has been argued that if schools and teachers can be provided minimum essential facilities, and the learners with continuous feedback, academic guidance and remedial work, then 80 per cent or more children would be able to master at least 80 per cent of the prescribed learning levels. The task of teachers' training was taken up by different District Institutes of Education and Training (DIET). For each primary grade and subject the necessary competencies are developed, and operationalised. Some support materials and handbooks are also developed, but have not become really accessible to teachers.

It is believed that the teachers who would have gone through the above training would report higher self-efficacy and competence than those who did not have the benefit of such training. This expectation is found justified in view of researches on self-efficacy by Bandura (1982, 86, 89) and others.

The term perceived self-efficacy was defined by Bandura (1989) as ".. people's judgement of their capabilities to organise and execute courses of action required to attain designated types of performance," indicating its relevance to specific domains of activity. Teachers may regard themselves as capable of doing well in one or the other subject, such as language or maths, but may not do equally well in both. Self-efficacy does however, relate to performance (Wood & Locke 1987, Taylor, Locke, Lee & Gist 1984; Gist, Schwoerer & Rosen 1989)

It may be argued that teachers whose perceived self-efficacy is positive will show higher level of competence and perform at a higher level. Reverse may be true of those having negative perceived self-efficacy Ashton and Webb (1986) defined teaching efficacy as personal beliefs about capabilities to help students learn. Teachers having low self-efficacy would avoid planning activities they believe exceed their capabilities. They may not persist with students having difficulty, or try hard enough to find relevant teaching materials. They may also not try teaching contents in innovative ways so that students can easily understand them and achieve mastery. They may not be able to initiate positive and satisfying interactions with students. Raundenbush, Rowan & Cheong (1992) demonstrated that the positive feelings of self-efficacy produce a "generative capability" that enables teachers to construct new teaching strategies ad increase their levels of efforts. These increased efforts on the part of the teacher should enhance their competence.

This research hypothesised that the teachers trained into achieving competencies would score higher on self-efficacy and competence than teachers not trained into achieving competencies. Another hypothesis tested the positive relationship of self-efficacy and competence in the two groups A final hypothesis tested the relationship of self-efficacy and competence with background factors of teachers.

METHOD

Sample

The sample consisted of 116 primary school teachers trained at DIET, Moti Bagh into achieving competencies (MLL) during the last two years This was treated as the experimental group Another control group of 110 teachers was identified from the comparable schools in South Delhi who had not been trained so far in achieving competencies.

Variables

The variables of self-efficacy and competence were identified as exploratory variables. The self-efficacy was operationalised here as by Bandura (1986), as teachers' judgement of their capabilities to organise and execute the school curricula in a manner that would help to attain designated types of competencies It was to include, general and specific dimensions both positive and negative—what as a teacher I can and I can not do, and what any teacher in general can and can not do.

The competence was operationalised as teachers capability to mobilise and use the school resources effectively for learning, such as the ability of planning and preparation, ability to use the variety of teaching aids, ability to identify and follow appropriate teaching strategies, and the ability to undertake extensive interactions with students.

Tool

A number of items/statements were developed based on the above dimensions in Hindi Self-efficacy questions were designed on the model of the scale used by Woolfolk, Rosoff & Hoy (1990) Competence items used the above dimensions All items were judged for content appropriateness and language clarity by two researchers before giving to teachers. Many of the items were rewritten, again discussed till full agreement reached These were then given to 10 school teachers to judge for content appropriateness and respond After the obtained responses of teachers were fully analysed, approximately 15 per cent of the items which did not appeal to the teachers for content relevance and clarity, were dropped. The final questionnaire included 18 items on self-efficacy and 16 items on competence

Each item had a five-response format answer, ranging from never to always. In addition information was recorded on teacher's identification, age, educational qualifications, income and work experience Some qualitative data were also collected on teachers' perceptions of MLL as a strategy to improve the quality of primary schooling, the extent to which school practices hindered their teaching performance, availability of help from members of DIET, etc This information is still being content analysed as part of the larger research project and is not included here (Singhal & Sharma, 1996).

Procedure

The DIET Officers were contacted several times to obtain the list of teachers and their addresses, who have undergone their training at DIET, Motibagh from its inception The permission was obtained from Education Officer of NDMC. Once the schools of the concerned teachers were identified, the school principals were contacted next. Only after meeting the principals, individual contacts were established with each teacher, their classrooms visited and appointments made for administering the questionnaire. The researchers had to visit more than once every teacher and sometimes a teacher about 7-8 times. The teachers in the control schools were identified independent of DIETs, but a similar procedure was followed for data collection. The difficulties experienced in the data collection from two groups were quite comparable. All data have been collected between January 1995 and February 1996.

The data have been analysed for means, SD, "t" values and correlations.

TABLE 1
Means, SD and "t" values for two Teacher Groups

Groups	*Exp. Group*		*Control Group*		*"t" Group*
Variables	*Means*	*SD*	*Means*	*SD*	
TC	23 77	2 26	20 87	2.71	8 74**
TCN	16 98	3 17	19 19	2 96	5.39**
IC	12 32	1.75	12 01	1.95	1 25
ICN	8 75	2.00	08 31	1 66	1 76
TSE	58 79	5.25	57.38	6 09	1 87
PP	11.06	1 245	10.78	1.68	1 47
TA	10 89	1 97	10 90	2.10	0 01
TS	27 59	1 99	26 98	2.71	1.97*
INTS	15 00	2 10	14 61	2 42	1 27
TCOMP	64 55	5 21	63 28	6.49	1.62
SES	04 09	0 75	04 03	0.86	0 54
AGE	02.23	0 77	02.06	0.68	1.74
WExp	01 98	0 88	01 67	0 81	2 74**

* $P < 0\ 05$, ** $P < 0.01$

TC. Teacher Can, TCN Teacher Cannot, IC I Can, ICN I Cannot, TSE Total Self Efficacy, PP Preparation and Planning, TA Teaching Aids, TS: Teaching Strategies, INTS Interaction Between Teacher and Students, TCOMP: Total Competence, SES Socio Economic Status, WExp Work Experience

RESULTS

Table 1 includes means, SD and "t" values for the experimental and control groups.

The data showed that although on dimensions of self-efficacy and competence as well as on the total scores, the means for the experimental group were slightly higher than the controls, the variability was more in case of the controls. Only a few significant differences between the two groups emerged.

The experimental group felt more certain about the power and capacity of teachers. Teachers believed that they can do many good things if they so desired (t = 8 74). The control group on the other hand had more valued observations made on what teachers can not do (t = 5.39). Thus while the approach of the experimental group is to proceed on a positive course, the approach of the control group is negative, which in turn reduces the effectiveness of their efforts for capability building On the I can not dimension and total self-efficacy scores though the experimental group scored higher, the mean differences remained marginal (t_3 = 1 76 and 1.87).

The experimental group was better in the use of strategies to communicate the contents to children, in adopting the questioning and answering method and in moulding the contents to the needs of children but the differences were not significant. The experimental group teachers had significantly longer work experience than the control group (t = 2.74), which in a way reflected on the policy of selecting teachers for training by schools/DIETS.

An item-wise comparison under different dimensions of self-efficacy and competence showed extreme response tendencies of groups on one or the other item. On the teacher can item (focussing on a content facilitating method of teaching), while 93.1 per cent of teachers in the experimental group responded highly positively, only 9.1 per cent of the controls did so Similarly on a teacher cannot item (focussing on the need of increased parental effort and involvement in child's study), 14.5 per cent more of experimentals respond highly positively On an "I can" item (knowledge of the method of increasing the learning competence of child), 92 8 per cent of controls responded highly positively against 18 per cent of the experimentals On the "I can not item" (training deficit to handle learning problems of children) 21 30 per cent less than experimentals respond positively.

Nearly 8 per cent more of controls responded highly positively to the preparation and planning item (time put in lesson planning), and 12 per cent more on teaching aid item (demonstrations/experimentation). Nearly 10 per cent more of experimentals respond highly positively to a teaching

TABLE 2
Correlation Matrix for the Experimental Group

Variables	*TC*	*TCN*	*IC*	*ICN*	*TSE*	*PP*	*TA*	*TS*	*INTS*	*TCOM*	*SES*	*AGE*	*WEXP*
TC	1.00	-0.06	0.53	-0.01	0.58**	0.11	0.31**	0.24*	0.39**	0.39**	0.00	-0.05	-0.07
TCN		1.00	0.09	0.33**	0.65**	-0.17	-0.10	0.01	-0.14	-0.13	-0.09	0.15	0.16
IC			1.00	0.19	0.69**	0.14	0.37**	0.25*	0.31**	0.39*	-0.09	0.11	0.19
ICN				1.00	0.46**	-0.15	-0.13	-0.07	-0.13	-0.16	0.04	0.05	0.01
TSE					1.00	-0.06	0.17	0.19	0.17	0.19	-0.06	0.09	0.12
PP						1.00	0.31**	0.32**	0.30**	0.60**	-0.04	0.00	0.05
TA							1.00	0.47**	0.37**	0.77**	0.06	-0.03	-0.06
TS								1.00	0.30**	0.69**	0.07	0.14	0.09
INTS									1.00	0.76**	-0.16	0.15	0.08
TCOMP										1.00	-0.14	0.13	0.12
SES											1.00	0.30**	0.33**
AGE												1.00	0.83**
WEXP													1.00

* $p < 0.05$, ** $P < 0.01$

TC : Teacher Can, TCN : Teacher Cannot, IC : I Can, ICN · I Cannot,TSE . Total Self Efficacy, PP · Preparation an dPlanning ·
TA Teaching Aids, TS . Teaching Strategies, INTS · Interaction Between Teachers and Students TCOMP Total Competence
SES . Socio Economic Status, WExp Work Experience

TABLE 3
Correlation Matrix for the Control Group

Variables	*TC*	*TCN*	*IC*	*ICN*	*TSE*	*PP*	*TA*	*TS*	*INTS*	*TCOM*	*SES*	*AGE*	*WEXP*
TC	1.00	0.23	0.53	–0.01	0.74**	0.14	0.37**	0.22*	0.31**	0.37**	0.22	–0.05	–0.03
TCN		1.00	0.29**	0.35**	0.74**	–0.16	0.04	0.13	0.08	0.05	0.08	–0.05	–0.02
IC			1.00	–0.01	0.71**	0.05	0.25*	0.03	0.28*	0.21	0.11	–0.02	–0.02
ICN				1.00	0.32**	–0.21	–0.03	–0.07	–0.20	–0.17	0.01	0.03	0.03
TSE					1.00	–0.01	0.29**	0.17	0.24*	0.26*	0.18	–0.06	–0.07
PP						1.00	0.41**	0.25	0.16	0.56**	0.01	–0.19	–0.17
TA							1.00	0.47**	0.37**	0.77**	0.06	–0.03	–0.06
TS								1.00	0.43**	0.90**	0.24*	–0.19	0.28*
INTS									1.00	0.71**	0.09	–0.06	–0.06
TCOMP										1.00	0.15	–0.16	–0.2
SES											1.00	–0.05	0.29**
AGE												1.00	0.66**
WEXP													1.00

* p < 0.05, ** P < 0.01
TC Teacher Can, TCN . Teacher Cannot, IC I Can, ICN : I Cannot,TSE : Total Self Efficacy, PP · Preparation and Planning
TA : Teaching Aids, TS . Teaching Strategies, INTS · Interaction Between Teachers and Students TCOMP · Total Competence
SES · Socio Economic Status, WExp Work Experience

strategy item (feedback to students), and a 14 per cent more than controls to interactions with students' item (children come forward to clear their problems/confusions).

Tables 2 and 3 present correlations among the dimensions of self-efficacy and competence and the personal variables for the experimental and control groups.

In case of self-efficacy, all dimensions correlate highly with the total in the two groups, indicating a good deal of part-total reliability of the scale used. Also the can and can not dimensions have showed a low correlation with each other which is expected All the correlations among the dimensions and the total competence were significant above 5 per cent level for the experimental group Many of the correlations were significant even for the control group, except one between the preparation and planning and the interactions with students (r = 16).

SES of the experimental group does not correlate significantly with any of the dimensions of self-efficacy and competence, but one significant correlation with teaching strategy is observed in the control group (r = .24). It appears that teachers having good socio-economic status see more options and can mould themselves easily. SES correlates negatively with age (r = –.33), and work experience of the experimental group (r = – 30) and with work experience of the control group (r = – 29). The younger teachers in both groups seem to have better socio-economic status As expected, in both the groups age and work experience correlate positively (r = .83 and r = .66).

Several significant correlations are observed among dimensions of the teacher can and I can dimensions of self-efficacy and teacher competence in the two groups, but there are more significant correlations in the experimental group The self-efficacy had almost no correlation with preparation and planning dimensions of competence in any group, suggesting that it is perhaps one of the most neglected dimensions, which would require attention if teachers have to become more self-efficacious The total self-efficacy correlates positively with several dimensions of competence in both groups, but significantly in case of only the control group. The correlation between self-efficacy and competence are positive for both groups, but significant for the control group (r = .26).

Discussion

The results provide positive support to the hypothesis of higher self-efficacy and competence of primary school teachers trained into specific competencies, but the differences are limited. The controls scored consistently lower, but not significant most tiems. The findings highlight the importance of school context in which teachers still did not have the pre-conditions of training satisfied They did not have access to support materials and guides, and the class size continued to be large High teaching efficacy has been found positively associated with individual attention given to students, keeping tab of individual child's progress in learning languages and maths achievement (Ashton & Webb 1986), and these are the very things which teachers found extremely difficult to undertake in the present context. Moreover, since training into achieving competencies in teaching different subjects (MLL) is an inservice training, the specific competencies should be differentiated from general competence which all teachers strive to promote with more or less similar effectiveness This makes the differences real even if few. To this extent the marginal differences between the two groups may be considered important outcomes of training. It is in line with the suggestions made by some other researchers that training contributes to increased teachers' efficacy, stimulates their competence and effectiveness of implementation of new teaching ideas (Ross 1944; Veenman, Tulder and Voeten 1994).

The general finding of significant correlations among the variables of self-efficacy and competence indicate that the two are interdependent. A higher self-efficacy would be found alongwith higher competence and this may have positive correlation with performance. This however needs to be tested little more systematically as the experimental groups placed higher reliance on "can do" against the controls emphasis on "can not do" dimension The finding of almost no correlation between self-efficacy and the preparation and planning dimension of competence suggests that the teachers who perceive themselves as having high self-efficacy do not necessarily spend more time and effort on the preparation and planning. They do not find space in the school timetable for it and thus escape from it. They do not get aids and guides and thus do not use these. They choose from limited strategies and use classrooms as continuous interaction grounds affecting the work progress adversely. These findings thus remain highly context-bound and somewhat different from other researchers (Ashton & Webb 1986; Gist, Schwoerer & Rosen 1989) Taylor, Locke, Lee and Gist (1984) noted the determining influence of perceived self-efficacy on the performance of academic staff members. It seems true that the teacher efficacy could be raised if teacher experienced successful applications of acquired skills and found supportive feedback. The current primary school situation, not being ideal to transfer the acquired skills by the teacher to the classroom, a low correlation between self-efficacy and competence may be an expected outcome. Eastman and Marzillier (1984) observed a similar correlation in less well defined performance situation. Further, the task of translating contents into specific competencies and assessing them precisely is a complex task not familiar to the teachers, which may have lowered down the relation between self-efficacy and competence (Campbell 1988, Earley, Connelly and Ekegren 1989). The provision of collaborative work may enhance self-efficacy as well as competence.

A partial support is found for the third hypothesis in that the background factors have only a couple of significant relations with dimensions of self-efficacy and competence, but may mediate indirectly The future researches should explore this as the evidence available on this issue was not pinpointed

Overall, the findings offer some important reflections on the policy of implementation of MLL training. Firstly, certain minimum operational conditions without which skill does not get converted into action and performance have to be ensured to the teachers. The minimum conditions should include an ongoing interaction of teachers with DIET trainers, providing with MLL handbooks, MLL books for students, communication between MLL officers and DIET trainers and an opportunity for teachers to voice their problems and seek help. Secondly, training should focus alongwith the development of subject specific competencies, on changes in attitudes of teachers The general sterotypic view that nothing will happen should melt, as it curbs efforts expenditure on the part of teachers. The training should facilitate the teachers' acquisition of a comprehensive understanding of the complex task attributes and how to exercise control on tasks and the context. Then and then only the training would help in improving the quality of schooling.

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Structure of Content and Mathematics Difficulties Among Primary Students

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The presentation has brought out the effect of context, content and construct on the acquisition of competencies by primary level students The investigator has stressed upon the role of cognitive psychology in understanding the mathematics related difficulties of the tribal and urban primary students. He has illustrated how the communication of various mathematical concepts such as subtraction, multiplication by zero, identification of geometrical shapes, and interrelationship between different measures of length, weight, volumes, etc., are rendered easy for comprehension, depending on the context and other pedagogical inputs. If the subject, students' needs, and situations are suitably controlled, success could be ensured

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INTRODUCTION

Mathematics teaching demands not only knowledge of content of mathematics but also an idea of available teaching strategies and their suitability for the students. The study of general principles of teaching and learning may not always be sufficient for teachers of mathematics becuase it does not include considerations of the nature of mathematics, children's thinking and their receptivity, and its implications for instructions In adopting a method for teaching concepts with a goal to maximise mathematics learning, there is need to understand the constraints for learning and teaching various mathematics concepts. These constraints may arise due to ineffective teaching strategies, poor concept formation, socio-psychological factors or the complex nature of the concept itself. Identified structure of knowledge from mathematics would provide a framework of subject matter and objectives for instructions Knowledge of learning constraints would help in developing ideas about successful practices and would help teachers to strategise their presentation of mathematics ideas through effective methods

A series of lessons on a mathematical topic is likely to confront student with practice problems of increasing difficulty. Novel ways of teaching particular mathematical topics are typically promoted with claims that they make those topics less difficult to learn Although the idea of studying the difficulties is not new, because sequential nature of the curriculum frequently turn on the notion of difficulty, the present study looks into the difficulty levels of mathematics concepts prescribed recently by the idea of Minimum Levels of Learning (MLL) at primary stage The difficulty levels identified in this study, would provide a framework for subject matter inclusion and objectives for instructions in MLL classroom

The difficulty of the topic however, is not the only factor that determines a successful instructional design, though it is an important one. The quantifiable concept of difficulty therefore, must be evolved based on the theory of cognitive processes. Children build a variety of perceptions of mathematics as they learn But one major obstacle in teaching-learning of mathematics has been the fact that more importance is given to teaching of mathematics rather than its learning. Developing multiple perspectives on students as learners of mathematics could enable teachers to build an environment in which children may learn mathematics with appropriate support and acceptance. Teachers need opportunities to examine children's thinking about mathematics so that they can select or create task that can help children build more valid conceptions of mathematics This seeks to understand the behavioural, cognitive and social factors as they are related to mathematics learning

The cognitive and development researches have documented that the prior constraints and principles govern children's learning and misconceptions, and influence the attainment of new knowledge and skills (Glaser & Bassok, 1989). Consistent with this fact, Hergenhahn (1992) recalls the views of Herbart (1928-92), the first educational psychologist who believed that one must consider the learner's own experiences and perspectives if one is to maximise his or her learning. Various findings of psychological researchers have reported that children's needs, motives, abilities, interests and attitudes to a large extent determine the levels of learning (Mehedi & Gupta 1979). The works on learner centred psychological principles suggest that what and how much is learned and remembered is influenced by personal control, competence, salience of personal needs, personal expectation, affect, general state of mind and motivation Learning is filtered through individual's unique perceptions, thoughts, feelings and beliefs (McCombs 1994). On the other hand, the central claim of socio-cultural theories suggests that development of particular conception can be accounted for in terms of the engagement in culturally organised practices (Cobb 1994, Rogoff 1990) While looking at the possible causes of academic difficulties, Jones (1994) provides evidences of the importance of cultural variables in educational success and failure He points out that learning and academic performances are associated with the extent to which the learning context takes into account the psychological context of the learner

In recent years, researchers have come to recognise the role of cognitive, affective and social-cultural factors in mathematics education. The role of psychological variables in mathematics education have extensively been studied by McCombs (1992), Keating (1994) and Seigler (1994) While looking at affective issues in mathematics learning, Mclead (1994) points out that students' beliefs in mathematics and emotional responses to mathematics are important factors in mathematics learning The demographic variables are also relevant to any considerations of the problems confronting mathematics (Penner 1994) Mathematical activities are influenced by the cultural tools (Kaput 1994), and situational approach (McCombs 1994). The importance of cultural connection in the mathematics classroom is also highly recognised by Eisele (1995). Social interactions and communications in a variety of flexible and diverse (cultural, family background, etc.) settings and social support are also important determinant of mathematics learning (McCombs & Marzano 1990). As seen above, some researches emphasis on psychological factors whereas others on social factors in mathematics learning. Keating (1994) however, emphasises that mathematics activities must be understood in the context of social and development processes, i e., cognitive socialisation, and other interaction and occurrences within the instructional environment. Solomon (1989) similarly, points out that the mathematical problems that students attempt to solve and the solutions they construct in the course of thier development have a social as well as cognitive aspect Recently, while looking into various perspectives Saxe and Bermudez (1995) argue that an understanding of mathematical learning requires the coordination of two perspectives—constructive and socio-cultural: because children's construction of mathematical goal is interwoven with the socially organised activites in which they are participants

In spite of the proven usefulness of cognitive psychology in the field of learning in the Western countries, in India, much empirical supports have not been created for the theories of cognition Learning of mathematics, is no exception Recently, it has been reported that analysis of existing researches in the field of education reveals no sincere effort that has been made to relate cognitive theories with the learning of mathematics (Saha & Singh 1996) By examining as many as 220 researches reported in India in the field of mathematics teaching up to 1995, they fond that only 8 could be associated with the use of cognitive psychology in the teaching learning of mathematics It is therefore, the need of the day to understand the cognitive based learning of mathematics We have to relate the cognition, learning of mathematics in such a way that the resulting programme/model of learning mathematics makes it possible for almost each and every learner/teacher to fulfil his/her needs with utmost ease. Keeping these facts in mind, the study aimed to look into the difficulties in mathematics in relation to structure of contents and other socio-psychological factors.

SPECIFIC OBJECTIVES

1. To study the difficulty levels of various mathematics concepts of Minimum Levels and to look for possible mismatch between sequential nature and difficulty levels of mathematics concepts
2. To find out the differences between rural (tribal) and urban students in the difficulties level of various mathematics concepts and contents items involved within particular concept
3. To examine the relationships between difficulty levels of various mathematics concepts and among various content items of particular mathematics concept
4. To examine the relationships of the mathematics difficulties with the social and psychological factors for various groups.
5. To analyse the nature and causes of errors on mathematics concepts.

METHODOLOGY

The study aimed at developing an understanding of difficulties in mathematics in Minimum Levels of Learning (MLL) among primary students in relation to structure of content and other socio-psychological factors that promote reflection about students' mathematics learning It was assumed that although the sequential nature of mathematics curriculum is based on the notion of difficulty of the concepts, the competency may not match to this The difficulties in mathematics may have meaningful relationships with the structural and factorial nature of mathematics concepts. With the fact that socio-psychological factors play important role in teaching-learning process it was assumed that the factors of social context, social support, classroom interactions, mathematics attitude and self concept may influence the mathematics difficulties of primary students.

Sample

The subjects for the present study comprised of the students of Grade 4. The samples were taken from five rural (tribal) schools in Raigarh and Thane District of Maharashtra and one urban school in Mumbai A total sample of 326 were used, of which 194 students (113 boys and 81 girls) were from urban school and 132 students (97 boys and 35 girls) were from rural schools. A method of quota sampling was used.

Research Design

Following a post-hoc research design, the data were collected after the students learned the concepts in which the difficulties were to be studied.

Variables

Following variables were included for the present study.

(a) Classificatory Variable. This was used to form sample groups The subject were classified on the basis of context—Rural (Tribal) and Urban

(b) Mathematics Difficulties: This was defined in terms of competency score as well as comprehensibility on various mathematics concepts.

(c) Mathematics Attitude· This was operationalised in terms of the dimension of liking and disliking towards mathematics

(d) Self-concept: This self-concept refers to perceptions or views of oneself. It is the sum total of the individual's thoughts and feelings about himself/herself as an object

(e) Classroom Interaction· This was used to refer whether student consulted teachers and peers while doing mathematics.

(f) Social Support: This was included to refer whether students got help from any family members while doing mathematics

Tools

(a) Test: The standardised mathematics achievement test for grade IV students developed by NCERT was used The test used here had been pretested on grade IV students of Maharashtra The test constituted 10 different areas of mathematical concepts The test was comprised of 40 multiple choice items which were formulated based on the ideas of minimum levels of learning.

(b) Questionnaires·

1 *Demographic characteristics:* This section contained 16 questions, out of which 9 were related to the identification of the respondent such as age, gender, caste and family background such as parental education and occupations, and number of family members. Remaining questions in this section were related to attitudes towards mathematics (like/dislike) attitudes towards teaching of teacher, interactions with teachers and friends, and family support. The subjects were required to respond these items on a multiple choice of "Yes"or "No "

2. *Self-concept scale* A short-form of a standardised questionnaire developed by Nagpal (1993) was used. The original questionnaire had 120

items in Hindi language It was translated into Marathi Based on a pre-test on a sample of 50 grade IV students, 40 items were selected for the present study The subjects were required to respond with a choice of "Yes" or "No."

Organisation of the Study

All the questionnaires were compiled into one set and mathematics test into another set The test and questionnaires were administered in two separate sessions Mathematics test was administered in the first session For this test, instructions were followed by black board illustrations In rural areas, it was required to repeat the instructions and examples Students were instructed not to linger on any question if they were not able to solve it, rather to attempt all questions and leave out those which they could not solve. They were told to do all sorts of rough works in the space against each question and could use backside of the page if needed Once the students started answering, each respondent was supervised to ensure that every one followed the instructions Individual help was rendered to students who had doubts Enough time was given to understand the examples and in doing the test The unhealthy practices like cheating and copying were checked by proper monitoring. When a student finished the test it was collected and checked thoroughly. If a few questions were wrongly answered and no rough work was shown the concerned student was requested to tell the procedure he/she followed to arrive at the answer. Some of the students were also interacted in a similar way while they were doing the test. After the test papers were collected from all the students, a rest period of about 15 minutes was given. During this period the students who took interest in enquiring about few questions they were dealt with cordially. In the second session, the set of questionnaires was given. In the first page, students were helped to fill up a few questions related to demographic information. When all these questions were completed by all students, instruction was given for other questions They were asked to answer remaining questions by using alternatives of either "Yes" or "No." An example was shown on the black board When they started responding the items each student was checked to ensure that everyone was able to respond properly Students were helped individually in case of any doubts in understanding the questions Data collected through test and questionnaires were paired for each student. After initial scrutiny, data of 326 students were used for the analysis.

Analysis Analysis of data was done by using percentage and simple statistics of Mean, Standard Deviation, 't'-test and correlation Besides, the error analysis was done based on the introspective reports of the respondents, participative observations and rough works against each question.

RESULTS AND DISCUSSION

The data were analysed to investigate the difficulty levels of various mathematics concepts for rural and urban students A correlational analysis was done to examine whether the difficulties of different concepts in mathematics were interrelated and to what extent the difficulty in mathematics was related to other socio-psychological factors of learners

TABLE 1
Difficulty Levels of Various Mathematics Concepts

No	*Content Areas of Mathematics*	*Rural*			*Urban*			*Total*		
		M	*F*	*T*	*M*	*F*	*T*	*M*	*F*	*T*
1	Number recognition	.34	31	33	65	.69	66	50	58	53
2	Place value	12	.09	.11	45	.49	47	.30	.37	32
3	Addition	44	48	.45	61	.60	.60	52	57	54
4	Subtraction	22	08	18	.58	.61	.59	.42	.45	42
5	Multiplication	.30	.41	.33	.71	74	.72	.52	64	.56
6	Division	.38	46	40	74	79	.76	.58	.69	62
7	Weight/Measure	21	.21	21	.37	36	.36	29	.32	.30
8	Time/Period	30	24	29	69	.72	.70	51	54	54
9	Fraction	.05	.03	05	.11	14	.12	08	10	09
10	Geometrical figure recognition	.47	54	.49	84	81	83	.67	.73	.69
11	Geometrical shapes	42	.46	.43	.72	72	72	.58	.64	60
12	Addition and subtraction	.19	20	19	38	50	.43	29	.41	.33
13	Addition and Multiplication	.24	.23	24	.51	43	.48	39	.37	38
14	Multiplication and Division	08	06	08	23	.25	24	.16	.19	17
15	Multiplication with zero	.11	06	.10	.24	19	.22	.18	.15	17

DIFFICULTIES OF MATHEMATICS CONCEPTS

Difficulties of the mathematics concepts were defined in terms of the average performance score of students on each concept and their understanding of items. The results revealed that the place value, weights and measurements, and fraction were more difficult concepts. Among the four basic arithmetics, subtraction was found more difficult compared to multiplication and division. This finding was not consistent with the idea that sequential nature of curriculum is based on the difficulty of concepts. Even the concepts which are placed on top of the hierarchy of curriculum such as geometry, time and period, and division were found to be less difficult The items involving more than one operation appeared to be more difficult for the students These facts were found true for the students of both rural and urban areas This was consistent with the information processing theory which states that the difficulty of a cognitive process can be defined in terms of the number of primitive operations needed to complete the process (Gardner 1985).

The variations in the difficulties of concepts were more prominent for rural students While the score on addition was found 45, the score on subtraction and place value were 18 and 11 respectively. The number recognition/reading which is primary to other concepts was also found more difficult than a few other concepts Rural students could achieve the MLL only on addition, division and geometry It was interesting to note that geometry which is taught in later stage was performed better In order to understand the variations in the differences between rural and urban students on difficulty levels of various mathematics concepts, significance level of mean differences were calculated. It was seen that urban students significantly differed from rural student on the difficulty levels of each mathematics concept. The differences in the mean scores however, indicated that the scores on addition, weights/measurement and geometry were relatively closer between rural and urban students This might have implications on classroom teaching of MLL curriculum, particularly in rural areas The above findings might seek to address the specific components around these difficult concepts, so that expectations from rural children could be met. The traditional styles of teaching has to be reoriented and the practice session has to include the components mentioned in MLL, for which teachers need to be provided with guidelines during training programmes Since the number recognition/reading is fundamental to other concepts the lack of thorough understanding of this may make it difficult to learn the other concepts.

The correlational analysis revealed that difficulties of a few concepts were positively and significantly related to each other. For rural students the concept of place value was not significantly related to other concepts. Fraction was found significantly related to weight and time but not to other basic arithmetics The contents involving combined operations were not related to other individual concept. A slight variation in the correlations were found for the urban students. Addition had a positive and significant relationship with multiplication and division but not with subtraction. Multiplication and division were found significantly related to other concepts except fraction Similar to the case of rural students, the combined operations were also independent of other individual concepts. The concepts of number recognition, place value and addition were found independent of each other for both rural and urban students While the number recognition was found having a significant relationship with most of the concepts in case of urban students, place value exhibited the same in case of rural students. It thus, appeared that the mastery over one concept was not necessarily a prerequisite for the learning of other concept. Even if the individual concept is mastered, the problem involving more than one operation was not significantly influenced by this. This was found consistent with the theory of development which may have implications on classroom teaching of MLL content

NATURE OF CONTENT AND DIFFICULTIES IN MATHEMATICS

From the above findings it seems that whether a concept is difficult or not depends not only on concept itself but also on other factors, because the established fact of sequential nature of curriculum is not followed This led to go for a micro analysis by relating the difficulties to structural nature of content item of individual concept A further analysis was done by focusing on the content items within particular concept in mathematics in order to understand the constraints within a particular concept rather between the concepts The rural-urban differences were also seen on content items. The significance of mean differences at .01 level are marked with star(*).

TABLE 2
Difficulties within the Number Recognition/Reading

No.	*Sub-Units*	*Rural*		*Urban*		*"t"-value*
		Mean	*SD*	*Mean*	*SD*	
1	Number recognition in word form	48	50	80	40	6 14*
2	Multiple number recognition	.35	48	75	44	7 70*
3	Identifying serial position (Reversibility)	.27	45	38	.49	2 09
4	Identifying three digit number	.26	44	78	42	10 40*
5	Counting even numbers between two numbers	.18	38	.52	.50	6 88*
6	Identifying serial position of month	43	50	.74	.44	5.76*

A content-wise analysis of difficulties on number reading/recognition showed that urban students approached mastery on the contents involving either recognition or identification of number (items 1, 3, 4 and 6) It was seen that the item involving recognition of a number written in word form (item 1) was mastered (80 per cent above) by urban students. They achieved MLL on counting even numbers between two numbers (item 5), but could not achieve MLL on reversal identification of a number, i.e., identifying the serial position of a number in a descending order (item 3) On the other hand, rural students could achieve MLL only in recognising the number given in word form (item 1) and identifying serial position of a month (item 6). Multiple number recognition and identifying three digit numbers (items 2 and 4) even were found relatively more difficult for them Like urban students rural students also scored lower on reversal identification and counting even numbers. It appeared that the concept of even number either was not taught properly or a difficult concept to understand as it is associated with division and involves a twin processes of odd and even Similarly, the difficulty of identifying serial position in a reverse way or descending order perhaps caused by lack of practice. Although, as per Piaget's stages of development, it could be learned by the time child reaches grade 4, children might have lacked opportunity to learn it or learning might be interfered with the usual practice of reading number in ascending order

TABLE 3
Difficulties within Subtraction

No.	*Sub-Units*	*Rural*		*Urban*		*"t"-value*
		Mean	*SD*	*Mean*	*SD*	
1	Subtraction (Procedural)	.15	36	.56	.50	8 60*
2	Applied (Rs and Paise, Purchasing)	.24	.42	.71	46	9,47*
3	Applied (Metre and Centimetre, Cloth)	15	35	54	50	8,18*
4	Applied (Rs , Bank withdrawal)	18	39	.59	50	7 89*

As was mentioned earlier the concept of subtraction was more difficult as compared to other three arithmetics—addition, multiplication and division An inter-item analysis showed that there were variations in the difficulty levels within subtraction depending upon the structural nature of content items. The applied items of subtraction were seemed less difficult than the procedural item. A difference was noticed within applied items. The content item involving rupees and paise, and purchasing (item 2) was less difficult than the items involving rupees and bank withdrawal (item 4), and metre and centimetre related to cloth (item 3). This was found true for both rural and urban students. So far as rural-urban difference was concerned, urban students achieved MLL on all items whereas rural students could not achieve MLL on single item. The mean differences were found to be significant. A highest score on the applied item involving purchasing may mean that familiarity or daily life experiences perhaps facilitated the learning process. This might have implications on classroom teaching specifically in rural areas. Relating mathematical problems into day to day life experiences of children may help in better conceptualisation of mathematics concepts.

In contrast to subtraction, the procedural item on multiplication was found less difficult (Table 4, item 1). Both rural and urban students achieved MLL and even urban students achieved mastery level But the factual unit (item 2) as compared to procedural unit of multiplication was found more difficult for rural students The score on factual item was less than half of the score on procedural item. But for the urban students, both had equal difficulty levels However, the difference between subtraction and multiplication on procedural item might be due to the involvement of "borrowing" and "carry over" respectively It seemed that the borrowing made the task more difficult than the carry over The scores on applied items varied slightly due the number of digits to be handled, even though both items were related to rupees. However, rural-urban differences on each content item of multiplication was found significant.

TABLE 4
Difficulties within Multiplication

No.	*Sub-Units*	*Rural*		*Urban*		*"t"-value*
		Mean	*SD*	*Mean*	*SD*	
1	Multiplication (Procedural)	42	.49	82	39	7 84*
2	Multiplication (Factual)	.20	40	78	.42	12 72*
3	Applied (Rs., Single digit)	40	49	.69	.47	5 33*
4	Applied (Rs., Double digit)	30	46	61	.49	5 81*

On the concept of weight/measurement, a wide variation was marked depending upon the units of measurement and nature of item (table-5) It was important to note that rural and urban students could not achieve MLL on various content items of weight/measurement, except the item involving the applicability of a unit of measurement (item 6) where the urban students achieved mastery Although the rural students had highest score on this item, they could not even achieve MLL.

TABLE 5
Difficulties within Weight/Measurement

No	*Sub-Units*	*Rural*		*Urban*		*"t"-value*
		Mean	*SD*	*Mean*	*SD*	
1	Litre and M L (Factual)	10	30	26	44	3 90*
2	Litre and M L (Addition)	23	.43	25	44	0 41
3	Litre and M L (Division)	20	40	.22	.42	0.43
4	Gram and K. G (Factual)	11	31	29	46	4 45*
5	Gram and K G. (Division)	.30	.46	31	47	0 19
6	Metre, Centimetre, K.G and M. L (Applicability)	33	47	85	36	10 95*

It was important to note that amongst the content item of weight/ measurement the difficulty was related to nature of item (item 1 and 4) for the rural student whereas it was related to units of weight/measurement (item 1 to 6) for urban students. It was also seen that the units interacted with the nature of item to influence the difficulty levels for both rural and urban students (item 3 and 5) There were no significant differences between rural and urban student on the item where units of measurement interacted with basic arithmetical operations of addition and division (item 2, 3 and 5). These clearly revealed that the difficulty in mathematics to a large extent was determined by the structure of content rather than the concept itself More specifically, the concept of weight/measurement as a difficult concept was the function of units involved in it.

TABLE 6
Difficulties within Time/Period

No	*Sub-Units*	*Rural*		*Urban*		*"t"-value*
		Mean	*SD*	*Mean*	*SD*	
1	Hour and Minute	37	.48	78	.43	7 41*
2	Day and Date	26	44	.76	42	9 67*
3	Clock Reading	.22	42	61	49	7 69*

A uniform pattern of difficulty was marked on various content item of time/period for various groups of subjects (Table 6). The hierarchical nature of the scores of different content items was found similar for rural and urban students. Although, the urban students, as expected, scored significantly higher than rural students, both the groups had highest score on the item related to hour and minute and lowest related to clock reading The item related to day and date stood at middle. Urban students had approached mastery on all items whereas rural students could not achieve MLL.

TABLE 7
Difficulties within Geometry

No.	*Sub-Units*	*Rural*		*Urban*		*"t"-value*
		Mean	*SD*	*Mean*	*SD*	
1	Figure Recognition (Triangle)	.58	50	.87	.34	5 81*
2	Figure Recognition (Rectangle)	40	49	78	41	7 33*
3	Geometry rule (Rectangle)	.49	50	89	32	8 13*
4	Geometry rule (Square)	52	.50	86	.35	6.77*
5	Area	.25	43	46	50	4.05*
6	Capacity	48	.50	66	48	3 24*

The content items in geometry were classified in terms of figure recognition, identifying the properties, area and capacity (Table 7) It was seen that identifying triangles was less difficult than the rectangles. This was caused by unique feature of triangle; problem in the recognition of rectangle presented in vertical, angular and horizontal way; and confusion over rectangle and square. Even though the students knew the properties of a figure, they faced difficulty in identifying the same (item 2 and 3). The differences between rural and urban students on these items showed that rural student achieved MLL and urban students approached mastery. The most difficult part in the geometry was related to area and capacity. Again it was more difficult in understanding the concept of area than capacity. This was due to the use of technical term *kshetrafal* in case of area whereas *amount* in case of capacity A simplified version of area could have made it less difficult. The rural students could not achieve MLL whereas the urban students could. But on the item related to capacity both rural and urban students had MLL score. The result indicated that mathematics difficulties also determined by language factors

TABLE 8
Difficulties within Combined Operations

No	*Sub-Units*	*Rural*		*Urban*		*"t"-value*
		Mean	*SD*	*Mean*	*SD*	
1	Addition and Subtraction	.15	36	.32	.47	10 42*
2	Subtraction and Addition	23	.43	.54	.50	5 98*
3	Addition and Multiplication (Facual)	17	38	.42	49	4 97*
4	Multiplication and Addition (Applied, Rs)	.30	46	55	.50	4.65*
5	Multiplication and Division (Applied)	08	27	24	.43	10.37*
6	Multiplication with Zero	10	30	22	.41	3 05*

A wide range of variations were found in the difficulty levels related to combined operations The questions involving both multiplication and division; and multiplication with zero were found more difficult. It was interesting to note that there were a lot of variations in the question where addition was associated with subtraction and multiplication. There were more difficulties in the items which needed addition first and subtraction and multiplication afterwards whereas in other items (2 and 4) reverse was found.

INTERCORRELATIONS AMONG CONTENT ITEMS OF MATHEMATICS CONCEPTS

The intercorrelations between content items of a concept were calculated with the aim of examining the interdependence among content items It was seen earlier that various mathematics concepts were not related. It was assumed that if individual concept was not related, the content items or sub-units within a particular mathematics concept would be related as they are the factors of the same concept. However, the results showed no uniformity in the intercorrelations As the difficulties of the content items of a concept varied, so did the relationships between them While few content items were positively and significantly related, others were independent of each other

Among the content items of number reading and recognition, a positive and significant relationship was found only between number recognition in word form (item 1) and identifying serial position of month (item 6) in case of rural students Similarly a significant positive relationship was seen between the content items of identifying the serial position of a number in a reverse way (item 3) and identifying the serial position of a month (item 6) Since both of the items involved in identifying the serial position, perhaps facilitated each other For the urban students, although a strong positive correlation was noticed between these items (r = .13) it was not found to be statistically significant No other significant correlations among 6 content items of word reading and recognition clearly indicated that the learning of each content item was not influenced by others.

It was revealed that the procedural subtraction (item 1) was significantly related to applied one (item 2) involving rupee and paise, and purchasing (r = .20) but not to other applied items (item 3 and 4) in case of rural students This perhaps because of the familiarity of rural students with rupees and purchasing and lack of experiences with bank withdrawal and metre and centimetre. In contrast, for urban students procedural subtraction was not significantly related to applied items involving purchasing. In case of multiplication it was seen that procedural and factual content items were not significantly related for both rural and urban students In case of rural students, while procedural item was significantly related to applied items (3 and 4) involving single and double digits respectively, the factual item (2) was not significantly related to the applied items The applied items were also found not significantly related to each other for rural as well as urban students. It indicated that in case of multiplication the procedural learning and factual learning were independent of each other, and the procedural learning only influenced the applied learning.

The correlations among content items of weight and measurement were related not only to various units of weights and measurements but also the basic arithmetic involved in it. The results revealed a similar pattern of relationships for rural as well as urban students The unit of kilogram and gram associated with the unit of Division (item 5) was significantly related to factual items (4) and to item having similar unit of arithmetic but different unit of measurement like litre and millilitre (item 3) It was assumed that in case of the items 5 and 4 the specific unit of weight and measurement and in case of items 5 and 3 the arithmetic of division influenced the performance on these items.

In case of time and period all three content items were found related. A low correlation with clock reading for rural students perhaps results from less familiarity with clock by many students. In geometry, the content items related to identification of structural properties of the figure and the figure itself were positively related for rural students. On items where the students had to identify different geometrical figures were also related (item 1 and 2) In case of rural students, the items dealing with identification of structural properties of geometry figures were significantly related to the item dealing with capacity but were not significantly related to the item dealing with area. Bu those who could identify the area of shapes also did well in identifying capacity (r= 18) In case of urban students, almost all content item of geometry were independent of each other. It seemed that in geometry, the performance of rural students mostly cue dependent whereas of urban students it was task dependent.

The intercorrelations for the content items involving combined operations showed that most of the items were independent of others It suggested that even if the individual unit was mastered, when a problem contains the operation of two units, the mastery over each unit did not facilitate performance of latér one It was found that two items (3 and 5) where multiplication was involved with addition and division respectively, were significantly related. It might be due to the fact that the association of multiplication with addition based on cumulative calculation and with division based on reversal calculation helped in better understanding the problem

From the above correlational analyses, it appeared that different content items or sub-units of a mathematics concept were not necessarily dependent on each other. Within the same concept, learning of one particular aspect might not have significant influence on other. So while teaching a particular concept in mathematics, an equal emphasis has to be given to each aspect of the individual concept.

SOCIO-PSYCHOLOGICAL CORRELATES OF MATHEMATICS DIFFICULTIES

A correlational analysis was done to find out the relationships between mathematics performance and some socio-psychological variables. From Table 9, it was evident that there were lot of variations in the socio-psychological correlates of mathematics performance between rural and urban students. A positive and significant correlation between father education and mathematics performance for urban students indicated that the students whose father had higher educational status performed better in mathematics. But this was not true in case of rural students Friend support had a negative correlation with mathematics performance for both rural and urban students This suggested that those seek friends' help in mathematics performed poorly. This perhaps happened due to fact that the students when consulted with friends, they did so not for learning or better conceptualisation rather for mere answer or showing a good result in the classroom. On the other hand, teacher support was found positively related to mathematics difficulties only for urban students indicating an important role of teacher-pupil interaction in mathematics learning A non-significant correlation for rural students perhaps caused by less teacher-pupil interaction in rural areas, particularly for the learning purpose. The positive and significant relationships of mathematics attitudes and self-concept with mathematics performance for the rural students indicated that the rural students having positive attitude towards mathematics and high self-concept did well in mathematics But these factors were not important for mathematics learning in case of urban students.

TABLE 9
Relationship of Mathematics Difficulties with Socio-Psychological Variables

No.	*Variables*	*Rural*	*Urban*
1	Father Education	01	25*
2	Father Occupation	11	16
3	Mother Occupation	06	07
4	Home Support	– 02	– 09
5	Friend Support	– 20*	– 18*
6	Teacher Support	.07	19*
8	Liking towards Mathematics Teaching	.10	02
9	Mathematics Attitudes	19*	11
10	Self Concept	20*	06

ANALYSIS OF MATHEMATICAL ERRORS

This section illustrates several typical mathematical errors made by students These errors were analysed from the points of view of mathematical terminologies, developmental psychology, learning theory and theory of instruction The nature and possible origin of errors were identified based on the observations of procedures that the students adopted to solve the problem (available from the note sheets), and through discussion with students and teachers In some cases the procedure followed by students for a particular problem leading to wrong answer were not clearly marked from the note sheets This led to seek students help and the concerned students were interacted carefully to introspect the methods adopted to solve the problems The interaction of this type with about 20 per cent of the students provided a lot of insights to understand the causes of errors. Arguments made by the students were analysed critically The type of error was named depending upon its origin. The mathematics items presented below would represent a sampling of the error types which had been observed and would ask for due consideration in MLL class room

It was observed that the error in the case of number recognition and reading were produced by one of the organisational principles of perception, i e , *familiarity* The majority of the students committed error by finding a familiarity between the digit 7 as 10th unit in 79 and the word *satar* in the word of *ekonasatar* (69) Some other students did mistake by equating the digit 9 of 79 with *nabwe* in the word of *ekonanbwe* (89). On place value, the errors marked was most unusual. It was observed that the error in this case caused by the confusion over the recognition of unit place because of day to day practice of writing from left The students were able to write a three digit number correctly but they did not have clear understanding of the place value For example, when they were asked to write a three digit number, they could do so but once they were asked to write a number using digits in three unit places in a random order like 10 unit, unity, and 100th unit, they wrote serially by putting 10th unit digit in left, unity number in middle and 100th unit number in right The errors due to this reason might have implication on teaching the place value Teacher should not get confirmed that once the students able to write a multi-digit number as per pronunciation, has understood the concept of place value The multi-dimensional exercises could help teachers to understand the problems and accordingly could take the remedial measures According to the theory of learning, learning through discrimination helps in better conceptualisation The exercises of various types where students have to identify the unit place of a number or vice versa, therefore, would help students for better learning.

The error in addition was mostly due to the concept of "carry over" and practice. Students produced error because they forgot to add the "carry over digit" in the next column Sometimes added only 1 even after the addition of first column became more than 19. The main criterion that "when the addition of digits gives a number more than 10, the carry over starts" predominated to add 1 rather than 2 or 3. This might have an implication on the classroom practice Teachers should make it a point that every student should write the additional values on the above of left side column, especially in the early stage when the concept of carry over is taught Similarly, the main problem in subtraction was related to "borrowing" and especially when "zero" was involved. The interaction with the students on this problem led to conclude that the students know "borrowing" but they misunderstood that from immediate next column digit it could be borrowed When a problem with the involvement of "two digits" and "no zero" was given they could solve it correctly. But the problem involving three digits and zero in middle, they faced problem. Similarly, another peculiarity was noticed with most of the students They borrowed from third column for the first column finding zero in between which perfectly correct but they did not understand what would happen to zero when borrowing was done crossing over it The preconception that when numerator is less than denominator, there should be borrowing led them to borrow again for zero in second column The misconceptions related to zero therefore, need special attention

The error in multiplication with zero yeilded an important psychological explanation. In multiplication when zero comes first and digit second, the result was produced as equal to the digit This was because of the idea that zero being in left does not carry any value dominated to produce errors Similar problem was marked in case of division. While doing procedural division, if the remainder was zero two times consecutively, they cancelled the zero and brought next digit from dividend but did not put zero in the quotient.

The students while answered the factual question in weight/measurement, the errors were found to be triggered by the confusion over unit place. Students got confused over the number of factors involved in the unit of measurement like metre, centimetre, decimetre, litre, gram and so on, and the equations which usually ranges from 10 to 1000. The errors in the area of weight/measurement were mainly rooted in this complexity The teaching of this mathematical concept therefore, needs special attention. In the problem related to time and period, it was seen earlier that the difficulty of clock reading was more as compared to day and date, and hour and minute. In clock reading, the error was produced by the students' wrong notion on direction of movement of hands and multiplication with 5 in case of minute hand. The learning of timing therefore, needs practical experience along with factual information for a concrete knowledge Although, fraction was found most difficult area of mathematics at primary stage, the error observed here was perceptual in nature When the figure showed two different figural representations (shaded and unshaded), the usual tendency of grouping in perceptual field operated to influence the mathematical reasoning, thus led to error For example, when the question to find out the proportion of shaded units from the total units of the figure, the students found the proportion from the total unshaded units Lastly, the error in the area of geometry was seen in a figure recognition problem The error was related to identification of rectangle among other geometrical figures The error was found rooted in the classroom instruction The students were found having the knowledge of basic properties of rectangle but the presentation of figure from a different angles—horizontal, vertical and angular, triggered the error Students identified the figure presented in horizontal way as the rectangle. Their answer was justified by the classroom instruction While teaching rectangle students were shown examples of rectangles in a horizontal way. This figural knowledge restricted the application of rules to the figures presented in a vertical and angular way.

It became apparent that a major aspect of the response errors were rooted in an alternative understandable pattern of rules. Most of the errors were produced by a process of dualism, i.e , a different rule when zero involves as seen earlier in case of place value, subtraction and multiplication It is also seen that errors were triggered due to inadequacy of language used in the definitions, rules or procedures names. Language inhibited the understandability. Most important were found to be inadequate instructions, interference between a prior belief and a new, conflicting set of beliefs to be learned, inability to concentrate in a task, lack of students' centration on the perceptual field and the mathematical readability levels of instructional materials. The errors illustrated above may be of interest to teachers and parents who concern about the common errors their students/children make. It was realised that most of the errors were methodic and there were some understandable patterns in them knowledge of these patterns may help in remediation of these errors.

CONCLUSION

Following conclusions were drawn from the present study

1. The sequential nature of curriculum might not necessarily be based on difficult level of the concepts The concepts of place value, subtraction, measurement and fraction in MLL curriculum were found more difficult for the primary students The competency on various mathematics concepts were not significantly related to each other

2 The difficulty levels of the mathematics concept depended upon the structural presentation and number of units or operations involved in it Language complexity also increased the difficulty level of the content items.

3 Difficulty levels of procedural, factual and applied items in mathematics varied Acquisition of mathematics concepts were facilitated by real life experiences. Context thus, played a significant role in mathematics learning This was particularly true for applied items

4. Attitude towards mathematics and self-concept were found to play important role in mathematics learning

5. Complex and a lengthy presentation of content item, and item with greater number of digits produced "mathematics alienation/phobia."

6 Mathematics learning was positively related to teacher-pupil interaction and negatively related to peer interaction indicating that pupil interacted with teachers for learning whereas with peer for more answer at primary level

7 While few errors were peculiar to students, others were perpetuated by curriculum patterns, language and teachers.

IMPLICATIONS

The present findings related to mathematics difficulty in Minimum Levels of Learning curriculum and its socio-psychological correlates of might have implications for the curriculum, classroom instruction, classroom interactions, evaluation process and teacher training programmes The general notion of sequential nature of curriculum based on difficulty was not necessarily true. The difficulty of a concept in mathematics depended not only on concept iteself rather on the structural nature of content item and instructional strategies adopted for teaching particular concept. The difficulties in a sub-units of a particular mathematics concept and the origins of mathematics errors identified in the present study, would provide an insight to pay attention to students thinking and in making pedagogical decisions.

It was found out that rural students faced more difficulties than urban students in MLL curriculum pattern. They could achieve minimum levels of learning in additions, division and geometry The number reading and recognition being the basic to other mathematical concepts was not achieved up to a minimum levels of learning criterion. This needs serious thinking while implementing MLL curriculum in rural areas. In specific problems, a social facilitation effect was noticed The rural students could perform expectedly because of familiarity with the tasks in social environment. This suggested that situational approach to curriculum presentation can facilitate the understanding of a concept. In this regard, the outlines in MLL plan which states that textbooks need to be used for guidelines and teachers's duty is to supplement the textbook, need to be adhered to Teachers have to incorporate instructions in the real world context and children's experiences for which specific guidelines should be provided in teacher training programmes.

The finding that structure of the content item played important role in understanding and performance might also have implications for the evaluation process. If the aim of minimum levels of learning is to increase the competence not performance then the problem asked to students need to be properly designed to facilitate understanding of the problem This could be justified by the finding that difficulties of the item was influenced by language used in the content item. The nature of tasks (tests and assignments) assigned by the teacher has to match to the learners' experience for a better construction of knowledge and promote understanding.

The findings that attitudes towards mathematics and self-concept are significantly related to mathematics learning suggest that knowledge of subject is not sufficient for an effective teaching, teachers have to understand learners. A quality attitude should be developed within learners towards curriculum and the self-concept has to be fostered through a supportive system. A significant positive relationship of mathematics learning with teacher-pupil interaction and non-significant relationship with peer interaction suggest that teachers have to encourage participation and should monitor the peer interaction so that they can have intra learning is stead of merely seeking help for answere Teaching should no longer be regarded as a task performacne independent of leaner and learning and learning situations but as an interacting component of the teaching learning process.

Prescribing a standard curriculum for entire country and implementing a national testing based on Minimum Levels of Learning no doubt will be a laudable effort, but teaching of curriculum may require more than knowledge of the subject and traditional style of teaching for which a challenge job is ahead for the teachers as well as teacher educators.

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Towards Creative Learning—A Shift in Paradigm

Jomon M.G.

You may give children your love, but not your thoughts,
For they have their thoughts
You may house their bodies but not their souls,
For their souls dwell in the house of tomorrow,
Which you cannot visit not even in your dreams.
You may strive to be like them,
but seek not to make them like you
For life goes not backward nor tarries with yesterday.
You are the house from which
your children as living arrows are sent forth

—KHALIL GIBRAN

The study stresses characteristics of children as curious, innovative and creative The investigator expressed the view that every person is creative He has highlighted the oppressive nature of schooling that leads to conformity and the suppression of daring and innovative ideas of children He has shown evidence that teaching is targeted at the average children who constitute 80 per cent strength The 10 per cent of creative children are not at all addressed by the teacher.

It is pointed out that teaching is oriented towards convergent thinking and divergent thinking is not appreciated. Therefore, teachers have to be reoriented A change from output orientations to process orientation is required.

Creativity is the ability to discover new relationship, to look at subjects from new perspectives and to form new combination from two or more concepts already in mind Creativity is realised through the arrangement and association of knowledge and experience in new way producing unexpected results Often a creative product unifies a great deal of information and expresses it in a highly condensed form

According to Frank Barron (1973) creativity is the discovery of something that is novel but also useful or relevant or economical or elegant or valuable Abraham Maslow (1959) has identified creativity with openness in expressing feelings, receptivity to ideas, concern for others desire to grow as a person and actualise one's potential. Creativity as a field of knowledge, seeks to explain how human beings, either individually or collectively, reach solutions or produce works that are both novel and useful, the kinds of personality traits that help human beings to reach creativity solutions, and the techniques through which creative solutions may be found relatively quickly or inexpensively.

Learning is a dynamic and continuous behavioural process or attitude. The word "teaching" is derived from the root work "taikjon" which means "show how" In both the key words "teaching" as well as "learning" the focus is on "how" i.e., the process and not on "what" the content. "How" of things always relates to process which bring about new, creative and exciting results/products

A careful exploration and a critical analysis of today's educational system at primary level revealed that there is a struggle to impart maximum information and knowledge. The classroom content learning, instead of helping the students to grow and develop often stunt growth. We cannot expect children to keep pace with the vast body of knowledge which is available. The insistence of the teacher on content of the subjects do not ignite the cognitive faculty of the child but brings in boredom and strain which is a blockade for learning.

In content focused learning children are often expected to learn scientific, mathematical, moral and aesthetic skills and concepts without being helped to develop the tools of critical, independent and rational thought Here children simply learn the content of academic disciplines and learning to think is left to chance There is a need for clearer, more definite guidelines to be incorporated in the curriculum where children could think for themselves.

Much of our education is focused on the achievement of certain skills, rather than on the potential that might be achieved. The foundation for thinking skills needs to be laid early in life, for open-mindedness begin in the formative years when a child's identity as a thinking person is established Children can be taught to value their capacity for thinking, how to use reason as a tool for learning, how to learn from others and situations, and how to play their part in the shared enterprise of enquiry. For this, they need to be given the opportunity to work out their own thoughts, to put their own ideas into words, to advance theories and to justify their beliefs. They need to discover themselves creative thinking and feeling people. How these skills are nurtured at home and school is crucial to their development. In short if nor encouraged at an early age children will stop speculating and playing with ideas They need to learn to think creatively to prepare themselves for fast changing world

A damaging change in the learning process often happens around the age of three or four, which can last a life time. (Fisher, 1990) The child learns to stop guessing and inventing answes when his efforts are rejected After many such rejections the child stops speculating Instead the child asks questions "Daddy what is that?" He learns that answers lie not in what he thinks but in what the parent/teacher thinks. Here the focus of learning shifts subtly away from learner to teacher. Instead of steadily increasing his skill in retrieving, connecting, comparing, and transforming informations, the child passively relies on the authority of others That is if it does not know the precise answer or does not fully understand an observations, he waits for others to explain.

Our education system discourages creative thinking. In schools, children receive rather than give information and thoughts. Generally teachers expect children to learn and to reproduce the accepted wisdom-"learn this because I tell you "

Instead of stressing on curriculum, fact memorisation and examination, education should focus on learning processes. The teaching thrust should be on the students basic cognitive processes underlying all subjects. Cognitive functions include· defining, describing, comparing, analysing, thinking, finding the relationship, summarising, synthesising, discriminating, etc.

Children by thier very nature are creative. Children have sharpened senses and sensibilities, are very emotional, able to love and return love, are generous, remorse, friendly, affectionate, trustful, affiliative, etc. These are the inner resources which are required to cultivate creativity. Children also possess specific features of a creative mind, i e., they are not bound by conventions, rules and regulations They possess increasing tendency of IQ, have odd and queer behaviour They are rebellious and imaginative and possess a number of thoughts and dreams. They would like to be independent, different and are curious They bring in lot of surprises and look forward to anything that is strange, new and enjoy surprise events/objects In short they are born to be creative and this chracteristic feature of children brings in a lot of joy to the world.

In our system of education, children are not allowed to be creative. They are forced to be the victims of the educational systems, are crushed and devastated over a period of time Schools and homes succeed in providing children with the technical aids for learning Computers, calculators, etc cannot take the place of thinking. They are like pencils, pens and rubber, simply tools of the mind, tools for learning

Technology helps children to take may things for granted The opportunities that are available now were never there before. Yet they are often forced to be subjected to technologies—are asked to learn computers and watch TV/VCR for a specific period of time—instead of enabling them to enjoy its advantages to develop creative abilities to conceptualise events, situations, etc , which the technology make available to them. Only such a positve attitude and approach over a period of time will help the students to perceive the objects of observations differently thus, providing space to be creative.

According to Maslow, self-actualisation is healthy man's prime motivation Self-actualisation means actualising ones's potential, becoming everything one is capable of becoming i e , "what is a man can be, he must be." Education must be seen as a process towards this. In Carl Rogers's terms only education can help provide the environment necessary to be continuously learning and to be a creative individual Hence, schools should be anxious that the children they educate grow into fully functioning persons with "rounded personalities."

Research suggests (Barron 1969) that those who have high IQ scores need not necessarily be creative and vice-versa. It is also important to note that intelligence and creativity do not have high correlation. A study conducted (1967-70) in the University of Minnesota, Laboratory Elementary School had the following findings The researchers first of all differentiated the highly creative children (identified by tests of creative thinking) from highly intelligent (identified by the Stanford-Binet test) It was interesting to note that: (a) the highly creative groups ranked in upper 20 per cent on creative thinking did not rank high on high intelligence (b) the highly creative groups ranked in upper 20 per cent on intelligence did not rank high on creativity (c) those overlapped were very few (d) there is no statically significant differences in achievements as well between these two groups As a major conclusion it was found that if we were to identify children as gifted on the basis of intelligence test, we would eliminate 70 per cent of the most creative children The study was repeated in a number of schools and came out with similar conclusions.

In a study of Jacob Getzel and Philip W. Jackson (1962) found that teachers preferring the high IQs to high creative even when grade-wise both performed equally well. The high creative moodiness, unpredictability, penchant for humour, his habit of questioning basic premises and so forth, is often menace to the ordinary teacher while the high IQ child is bright and is eager to please the teacher. He confirms to teachers ideas and tends to become teachers pet

Researches also showed that highly creative child appears to learn as much as the highly intelligent one, without appearing to work so hard

Creative children are learning and thinking when they appear to be "playing around" They engage in manipulative and/or exploratory activities, many of which are discarded or even forbidden. They enjoy learning and thinking and this looks like play rather than work.

Today children are taught how to find right answer. As a result they lose the ability to look for more than one right answer, i e., alternatives to problems arising out of life situations. Therefore it is important to understand that education is not merely providing information and knowledge but a process of challenging students cognitive faculties and making them do their own learning The teachers should facilitate this process and enable the students generate information making them independent learners.

SPECIFIC OBJECTIVES OF THE STUDY

1. To study the present approach and methodology of the curriculum and school systems of primary schools.
2. To explore the responses of the students towards the existing educational system and observe their learning behaviour and pace
3. To observe the responses of the students towards creative environment, methods and process of learning.
4. To find out the impact of creative educational environment on learning and performance.

METHODOLOGY

The present study is an experience-based experiment conducted 1993 in an integrated school for the blind and a slum school nearby The Researcher formed three groups of 16 members each. The background and the learning capacity of all the three groups were more or less the same. All the groups were mixed with equal member of boys and girls. The first group was exclusively for the blind, second group normal children and the third group for the slum school. Each of the groups were further divided into two sections (A&B). All groups had a training programme for four months, two days per week with two hours. Though all the groups had certain common training programmes, the B sections (experimental group) had extra creativity inputs which were not given to A sections (controlled group). At regular intervals differences between the intra-sections (between A&B sections) and inter-group (between three groups, were observed

The background data for the study was collected through case studies on students and personal interviews with students parents and teachers. Secondary source of data was collected from school registers and other documents.

Selection of the Groups

All the three groups included in the study were selected through a test-cum-interview process and method. As soon as the investigator got the necessary permissions to conduct the study he met the students in the school at working hours. After a brief interaction a test was administered to them The variables of the test included intelligence, creativity, descriptive ability, language understanding, awareness, general knowledge and scientific attitude. Based on the central value of the total average, extreme cases were removed after retaining 18 cases closest to the central value. The same test procedures were repeated with all the three groups The test results were cross checked with their exam performance at the school in order to make sure they all belonged to the same category and background

TABLE 1
Average Total Tests Score
(out of 10)

	Groups	*Before*	*Test 1*	*Test 2*	*Test 3*	*After*
BLIND	Section 1	4	4.5	3.5	4	4
	Section 2	4.5	5	5	6	6.5
OTHERS	Section 1	5	4.5	5	4	4.5
	Section 2	4.5	4.5	5	5.5	6
SLUM	Section 1	3.5	3.5	4	3.5	4
	Section 2	3.5	4	3.5	4.5	5

Table 1 puts in a nutshell the performance results at regular intervals. Before the experiment the performance level of all the three groups and all the six sections were more or less same with slum school with slightly lower performance

The Experiment

All the three groups were to go through a syllabus which had to be studied for their school examination. Two basic methodologies were used

For all the A sections of the three groups the syllabus were covered through lecture method and textbook approach as normally done in their respective schools Every week two sessions of one hour each was held for them. The same syllabus was covered for the B sections of the three groups as well. Here creative methodologies were used for the sessions Students were asked to prepare for the class and their active participation also was guaranteed. Here the investigator acted as an enabler and helper rather than a teacher or an instructor. Each stratum of the syllabus was covered through different methods like skits, role plays, games, quiz programmes, etc.

At regular intervals their performance was observed and documented The performance levels were measured through a test process The students performance at the school examination also was compared after the experiment process to match and validate the tested experiment findings

MAJOR FINDINGS OF THE STUDY

1. Creativity is natural to children and they are looking for creative environment methods and process to respond creatively

2 The present day educational system emphasise on content, i.e., curriculum, fact memorisation and examination, rather than on cognitive faculty development and creative learning.

3. Children get bored easily with classroom teaching methodology and often study for the sake of examination. Therefore learning is a forced activity which brings along with it lot of strain. Forced learning is not effective and healthy for the growth and development of children.

4. Creative methods, approaches and processes make learning faster and effective. Here learning become a pleasurable activity

5. Creative learning environment, processes and methods improved the students performance in the examination and in other extra curricular activities

6. A network of parents, teacher and peer group with the student will enable an overall growth and development along with the learning processes. The personality and disposition of the above-mentioned have great influence on the student and on the learning process.

7. Logical inputs appealing to many senses relieves boredom of the learner and heightens attention and learning process.

8. Knowledge of results or information about performance (feedback) aids learning

9. There was no correlation between sex (boys and girls in all groups had same learning pace) and learning, better socio-economic status (e g. slum school and Integrated school for the blind) and learning and handicap (blind and normal children) and learning All the three groups

responded to creative methodologies of learning and environment Their performance was better compared to others who were not exposed to such methodology and environment.

10. Those exposed to creative environment and methodology were confident and took up further responsibilities. They had a better approach to problem solving and had a number of alternatives to a given problem

11 Attendance level of the creative environment improved as the days passed by but attendance level was either stable or came down for the groups which had normal environment of learning

IMPLICATIONS OF THE FINDINGS

1 Each child is unique and is creative in his or her own way. Learning can not be forced on any child. Children are waiting to respond to creative environment, methods and process An awareness of those realities raises a number of issues and challenges to parents, teachers, educational experts and policy-makers.

2 It is a great challenge for our society wherein system has the main say in educational process and teachers are only implementers of the system Hence structural and system alteration should be followed by unlearning and reeducation of our teachers

3. Creative learning is possible for all children including the handicapped It is to be noted that creative learning is all the more vital for the handicapped as their liability itself can be converted into an asset through creative learning methodology and process For example, it was observed that blind children have high memory of either what they have heard or touched compared to normal children. Emphasising on these two and introducing methods and process to match their extra faculty, learning can be made faster

4 It becomes a pleasurable activity since children themselves are active participants of the whole process.

5 There is cost benefit since the whole process does not go in for latest technology and modern equipments. The potential and the capacity of the child itself becomes the primary tool and source for the learning process and education.

6 Creative learning as a concept and practice can be universalised, since the starting point of the approach is in consonance with children's aptitude and mental framework

7 Introduction to creative learning especially at the beginning of one's life can be made very enriching if it becomes a habit over a period of time A creative attitude and approach can transform the lives of the

people since they will have always something to discover in ordinary and routine life situations

CONCLUSION

> The principle goal of education is to create men who are capable of doing new things, not simply repeating what other generations have done—men who are creative, inventive and discovers. The second goal of education is to form minds which can be critical, can verify, and not accept everything they are offered
>
> —JEAN PIAGET

Learning is intrinsic to human beings and it serves as a primary means to human progress and survival. Education enables a person to acquire knowledge, attitude, ideals, habits, etc., which are essential to be an effective member of the given society. Though everyone learns whether wants it or not with degree of variations, creative learning can make a difference as the above study has revealed Then learning becomes an art, science and a skill as it provides the learner with a creative proficiency of an artist, precise attitude of a scientist and perfected skill of a craftsman

Education is a common endeavour The roles of teachers and parents are vital in the process. They need to raise their own self-esteem and should have confidence in their own creativity; for often we teach more by what we are than what we say.

"No printed word, nor spoken plea
Can teach young minds what they should be
Not all the books on the shelves
But what the teachers are themselves.

—ANON

The study also revealed that the process is often more important in encouraging creativity than the solution of end product. Products may be short-lived but training in the process can be of life-long value. Such an attitude and approach over a period of time become a way of life. That is here the person learns from all encounters and life situations. As a result he/her will be able to contribute to the society through his/her own creative endeavours as active members of society. In short "Primary excellence is vital for success in life long learning" (Blunkett 1996).

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Universalisation of Primary Education and Equity in Quality

H.K. Senapaty

Tests were developed to assess selected competencies along with Piagetian tasks to assess cognitive development These tests were administered on 120 2nd standard and 125 4th standard children, from seven schools in urban, rural and slum areas of Orissa

Results indicated significant differences in the cognitive developmental levels and mastery of concepts in environmental studies across urban and rural samples. The rural and slum children were not very different. He advocated that universalisation of elementary education would not be complete with greater allocation of money and building funds. What is required is the reorientation of the content and processes to suit the local diversities.

Four and a half decade ago we the people of India had taken a vow through our Constitution that free and compulsory elementary education would be provided to all children up to 14 years of age within a period of ten years from 1950. Since then determined efforts have been made towards the achievement of this goal. Over the years there have been very impressive increases in the number of institutions as well as enrolment and retention. In the National Policy on Education (NPE) 1986, with revised modification in 1992, we have resolved to achieve the goal of Universalisation of primary education by the turn of the century emphasising on three aspects: Universal access and enrolment, Universalisation retention up to 14 years of age, and a substantial improvement in the quality of education. Despite our determined efforts we have been able to achieve only 52 per cent of literacy. Now, question arises: Can we achieve this goal by AD 2000? With the help of new innovations and alternative strategies, such as, disaggregated target setng and decentralised microplanning, strengthening the alternative chan-els of schooling, introducing minimum levels of learning, improving hysical facilities through operation blackboard scheme, establishing link-ges between programme of early childhood care and education, pri-ary education and adult literacy, priority in the eductaion of girls, dis-dvantaged and out of school children, restructuring the teacher training rogrammes, using the distance mode, introducing the mid-day meal rogramme, handing over the primary education to village panchayat vailing the external financial support for basic education and launching e National Elementary Education Mission (NEEM), it seems that we ay overcome the shortcomings and inadequacies and achieve the goal y AD 2000. Now another question comes to mind Can this education ccelerate, sustainable development as conceived in World Summit at io (1992), multi-dimensional social development as conceived in Social ummit at Copenhagen (1995) and the Human Development as conceived y the UNDP and World Bank. Secondly, can we maintain equity in uality? Taking into account the above factors, here in this paper, an ttempt has been made to find out whether there is equity in the quality f elementary education being imported in today's school and to suggest ays and means to maintain equity and improve quality keeping in view he concept of sustainable development, multi-dimensional social devel-pment, human development and quality of life and the new innovations nd strategies such as the participatory, action-oriented, target-oriented, amily-oriented and multi-sectoral approach.

BJECTIVES

1. To investigate whether there is equity in quality of primary edu-ation being imparted in the urban, rural and slum primary schools
2. To suggest ways and means to improve the quality in the context f universalisation of primary education.

YPOTHESES

o_1 There is no significant difference in the cognitive development scores, btained through Piagetian tasks, of II standard urban, rural and slum hildren.

Ho_2 There is no significant difference in the competency-based test cores, obtained through competency based test, of standard IV urban, ural and slum children.

SAMPLE

One hundred twenty standard II, and 125 standard IV children were selected from seven primary schools located in urban, rural and slum areas of Kendrapara and Khurda district of Orissa. One hundred twenty standard II children were selected from four primary schools (one public school, one urban primary school, one rural primary school and one slum primary school). Thirty standard II were selected from three primary schools (one urban, one rural and one slum). All the standard IV children of the three classes were selected for this purpose.

TOOLS

Two tools (i) Piagetian tasks (ii) Competency-based test were used in this project.

Six Piagetian tasks were developed on the concept of conservation of solid, liquid and number, seriation, classification and transitivity. The tasks were tried out on 25 standard II children and finalised for the final assessment. The tasks were developed on the basis of the syntax of the cognitive growth model (Joyce 1985)

The competency-based test was developed taking into account the 10 major competencies identified by NCERT (1991) for standard IV students on environmental studies. The initial draft of the test was prepared following the principles of criterion referenced test. The initial draft consisted of 10 test items for each of 10 major competencies. The initial draft was referred to 10 experienced primary school teachers for necessary comments and suggestions with regard to the suitability of the test items. On the basis of the suggestions, the test items were modified. The test was initially administered on 40 standard IV student of a primary school This initial try out gave clues to modify or omit the items. The test after modification again tried out on 20 standard IV children. The final draft of the test contains 50 items. The time duration is one hour.

PROCEDURE OF DATA COLLECTION

The Piagetian tasks were administered individually on 120 standard II children. One score was awarded for the correct response to the puzzling situation. One score for the correct justification to the response, one score for the correct response to the counter suggestion and one score for the correct justification to the counter suggestion Piagetian clinical method was followed.

The competency-based test was administered on 125 standard IV students. The test were administered in group

DATA ANALYSIS

The data were analysed with the help of one way ANOVA and "t" test

RESULTS

The Performance of Urban, Rural and Slum Children on Piagetian Tasks
ANOVA Table (one way)

Sources of variation	*Degrees of freedom*	*Sum of squares*	*Mean sum of squares*	*F*
SSA	3	3325 23	1108 41	20 30
SSW	116	6332 1	54 59	

The 'F' value of 20.30 with df equal to 3/116 is significant at 0 01 level It depicts that the children of urban, rural and slum schools differ significantly in their cognitive development scores

Mean Values and Their Significance of Difference on Piagetian Tasks
't' Table

	Mean	*N*	*Public School (Urban)*	*Urban Primary School*	*Rural Primary School*	*Slum Primary School*
Public School (Urban)	12 3	30		1.27	1 71	3 66**
Urban Primary School	10 2	30				462.41*
Rural Primary School	9 6	30				1 95
Slum Primary School	5.3	30				

The "t" value of 1 27 with df 116 is not significant at 0.05 level. It depicts that public school children do not differ significantly from the urban primary school children in thier cognitive development scores. The "t" value of 1.71 with df 116 is not significant at 0.05 level It reveals that the public school children do not differ significantly from the rural pri-

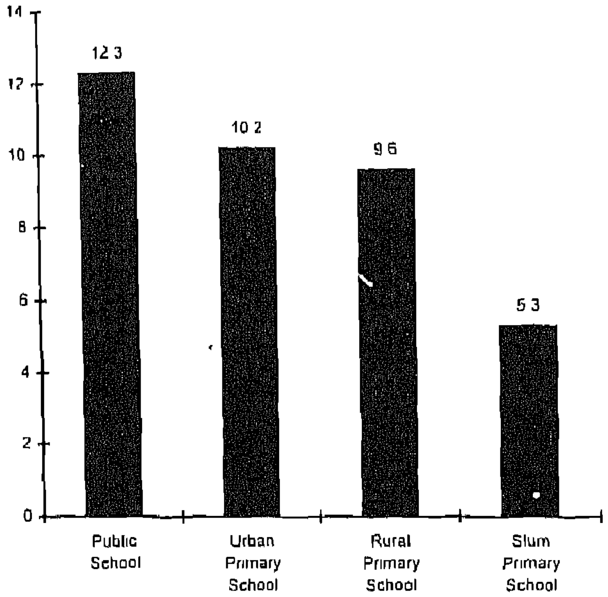

Figure 1. Mean score of II standard public school, urban, rural and slum primary school children on Piagetian tasks.

mary school children in their cognitive development score. The "t" value of .46 with df 116 is not significantly at 05 level. It indicates that the urban primary school children do not differ significantly from the rural primary school children in their cognitive development scores. The "t" value of 1.95 is not significantly at 0 05 level. It depicts that the rural children do not differ significantly from the slum children in their cognitive development scores. The "t" value of 3 66 with df 116 is significant at .01 level. It reveals that the public school children differ significantly from the slum school children in their cognitive development scores. The "t" value of 2.41 with df 116 is significant at .05 level. It indicates that the urban school children differ significantly from the slum school children in their cognitive development scores.

The "t" value of 5 14 with df 98 is significant at 0.01 level. It depicts that the urban children differ significantly from the rural children on the scores obtained through competency based test. The "t" value of 5.63 with df 73 is significant at .01 level It reveals that the urban children differ significantly from the slum children on the score obtained through competency-based test. The "t" value of 1 65 with df equal to 73 is not significant at 0 05 level It reveals that rural children do not differ significantly from the slum children on the scores obtained through competency based test.

Performance of Urban, Rural and Slum Children on Competency-based Test
't' Table

	Mean	N	*Urban IV Standard*	*Rural IV Std*	*Slum IV Std*
Urban IV Std	34 68	50		5 14**	5 63**
Rural IV Std	29 50	50			1 65
Slum IV Std	28 48	25			

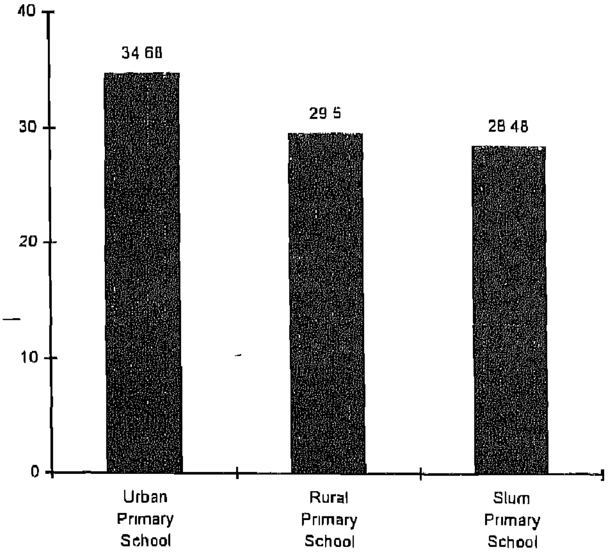

Figure 2. Mean score of urban, rural and slum IV standard students on competency-based test

Attainment of Mastery (i.e 80 per cent level) by the Urban, Rural and Slum Children

	Urban	*Rural*	*Slum*	*Total*
Mastery	22%	6%	Nil	11.2%
Non-Mastery	78%	94%	100%	88 8%

Thus above table reveals the fact that the urban children are in a better position as compared to their rural and slum counterparts It implies that there is no equity in the quality of primary education being imparted in urban, rural and slum schools. Secondly, the above table indicates that 11 2 per cent of urban, rural and slum children have reached the mastery level as against the desired level of 80 per cent. It reveals that the quality of primary education being imparted in today's school is much below the desired level

Attainment of Mastery Level among Boys and Girls in Urban, Rural and Slum Schools

	Urban	*Rural*	*Slum*
Boys	16.6%	8 5%	0%
Girls	30%	0%	0%

The above table reveals the fact that the performance of urban girls is better than the urban boys and the performance of rural boys is better than the rural girls It implies that the education of girl child is neglected in rural areas

Attainment of Mastery in 10 Major Competencies of Environmental Studies by the Standard IV Children

Serial No. of Competencies	*Attainment of Mastery*
Competency 1	64%
Competency 3	56%
Competency 8	51%
Competency 6	41.6%
Competency 10	37%
Competency 7	36 8%
Competency 2	35 4%
Competency 9	26 4%
Competency 5	24%
Competency 4	17 6%

The above table reveals the fact that the competency 1 is the easiest competency and the competency 4 is the most difficult competency for IV standard students.

The table reveals that competency 3, competency 1 and competency 8 are the easiest competencies for the urban, rural and slum children respectively, and the competency 4 is the most difficult competency for the urban, rural and slum children. The above findings implies an environmental variations in attainment of mastery level in 10 major competencies by the urban, rural and slum children .

Attainment of Mastery in 10 Major Competencies of Environmental Studies by the Standard IV Urban, Rural and Slum children

Urban		*Rural*		*Slum*	
Competency	*Attainment of mastery*	*Competency*	*Attainment of mastery*	*Competency*	*Atainment of mastery*
Competency-3	86%	Competency-1	56%	Competency-8	52%
Competency-1	82%	Competency-3	44%	Competency-1	44%
Competency-8	72%	Competency-10	40%	Competency-2	40%
Competency-6	54%	Competency-2	34%	Competency-6	40%
Competency-10	44%	Competency-7	32%	Competency-7	40%
Competency-9	42%	Competency-6	30%	Competency-3	24%
Competency-7	40%	Competency-8	30%	Competency-10	20%
Competency-5	34%	Competency-9	18%	Competency-5	16%
Competency-2	34%	Competency 5	18%	Competency-9	12%
Competency-4	26%	Competency-4	14%	Competency-4	8%

DISCUSSION

From the above findings it is clear that there is no equity in the performance of the urban, rural and slum children on both the Piagetian tasks and the competency based test It seems that the children are in an advantageous position as compared to their rural and slum counterparts. This differences in performance may be attributed to the school environment, family background, parental status and variations in urban, rural and slum environment, etc. But it is the duty and responsibilty of the school/education system/society to maintain equity in quality of primary education. MLL, (minimum levels of learning) seems to be the readymade answer to this question. Now question arises can we maintain equity in quality through MLL approach?

The findings reveal that (i) there is no equity in quality and (ii) the quality what we have achieved (22 per cent mastery in urban, 6 per cent and 0 per cent in slum) is much below the desired level. Environmental variations are also found in the difficulty level of competencies.

The above findings have serious implications for educational planner, administrators, curriculum designers, teacher educators, teachers, researchers and others who are involved in the process of universalisation of primary education. It is not just a function of providing more buildings, funds of additional teachers as assured by the operation blackboard scheme or organising more frequent teacher training programmes, introducing minimum levels of learning, replacing textbooks, or even handing over of the primary schools to village panchayat as envisaged in the new Panchayati Raj Act, or implementing the DPEP Programmes. It requires an alternative vision of the educational process which would bring about a change in the fundamental sense in the perception and role of a wide range of a persons including teacher and institutions engaged in the process of universalisation of primary education. It is high time to reorient the content and process of education and suggest steps so as to empower schools to play a combative role of crucial significance An empowered school with practical and realistic strategies such as participatory, target oriented, action oriented, family oriented, and multi-sectoral approach must link its content with the basic elements of quality of life namely biological, economic, social, environmental and humanistic equity and to improve the quality of primary education.

To create an alternative vision we have to synthesise the various individual alternatives already demonstrated successfully in areas such as community participation, pedagogic transformation, workings with Panchayati Raj institutions, networking, re-organising the curriculum and linking it with the productive work, creating school complexes, relating the content with socio-cultural diversity, remodelling the teacher education and 'other elements; and conduct sustained and indegenous researchers to improve the quality of education

In this connection the following issues relting to curriculum, approach and strategies to be followed for implementation in the context of universalisation of primary education and equity in quality may be taken into consideration .

Issues Relating to Curriculum

Since we have failed to fulfil the basic biological needs—nutrious food, clean air, unpolluted water, a life relatively healthy and free from sickness, adequate housing and sanitation—of our people, can we reflect these biological elements in our schools curriculum and fulfil our biological needs?

Since we have failed to provide opportunities to work to earn adequate income and modern material goods and have failed to develop economic capability and are not in a position to make an equitable distribution of the society's economic opportunities among the people, which imply a better earning capacity for the people living in rural and tribal areas, can these economic elements be reflected in the curriculum which would help in the equitable distribution of the society's economic opportunties among the people and provide the opportunities to work and enhance the earning capacity?

Since we have failed to help our people to participate in the affairs of society, and also have failed to abolish the discrimination on the grounds of sex, place, religion, race, etc., particularly in rural India, can we reflect these social elements in our school curriculum and make them realise that their participation is essential for national development?

Since there is mismanagement of basic resources like soil, water, forest, minerals and a mad rush for using up the non-renewable endowment of the earth to the degradation of ecology and environment, and a constant erosion of land-based basic resources due to technological development, can we reflect these environmental elements in our school curriculum, bring austerity in consumption, integrate environmental considerations in economic development, and raise productivity by conserving land-based and environmental resources

Since we are not living in peace and harmony, the psychological and effective aspects of human life—human feelings and emotions, particularly happiness, inner harmony, spiritual fulfilment, peace of mind and general contentment are affected, can we reflect this humanistic element in our school curriculum and make people happy and contended?

This curriculum may be designed and transacted keeping in view the four pillars of education, viz., "Learning to know," "Learning to do," "Learning to be" and "Learning to live together" as suggested in the preliminary report of the International Commission on Education for the Twenty-first Century (1993).

ISSUES RELATING TO APPROACH

After 49 years of independence our bureaucratic minds have not changed, the feudal spirit still continues to function in almost the same way as in the British period. Most people in the Government think that they are the master whom people must obey which has prevented the glow of freedom to reach the people. This feudal spirit and elitist biases have been reflected in Indian planning We plan without analysing the needs of the community, nature of change and procedure of implementation which has ultimately prevented us to reach the goal as a result of which we go on extending the time frame. (e g , universalisation of primary education). In this context, can we develop a participatory approach involving all the relevant members of the community in determining the priorities, in deciding the types of programme required for the development of the community and how can it be implemented?

After 49 years of independence we have not been able to set realistic and practicable development targets with carefully defined indicators of change for each community In this context, can we define the target of our educational programmes in quantitative (e.g , abolishing child labour) by integrating different socio-economic programmes into the existing curriculum, within 2 years from a community?

Our planning and programmes are not so much action oriented We have failed to reach the goal due to lack of proper implementation of our policies and programmes In this context, can we integrate various socio-economic programmes into the existing curriculum in the light of "learning to do" as suggested by the International Commission on Education for Twenty-first Century?

The main beneficiary of any development programme is the family. But our policies and programmes are not family oriented. In this context, can we organise educational programmes taking into account the needs and requirements of the family?

There is no coordination among different sectors of Government such as education, health, agriculture, communication, industry and so on. Similarly there is also no coordination among various sub-sectors of one sector, which has affected the community development and quality of life In this context, can we develop a multi-sectoral approach and coordinate these sectors for the purpose of universalisation of primary education and maintain equity and improve quality?

ISSUES RELATING TO IMPLEMENTATION

Since Learning is not confined to schools, and as we are going to put emphasis on "Learning to know," "Learning to do," "Learning to be" and "Learning to live together" can various activities of the society be turned in to sources of learning? Can various pieces be integrated into a new system that would be an educational system and not only a school system?

Can this educational system be made accountable for the education of each child in the community with freedom for adopting new strategies and innovations to reach the children of various segments of the society?

Can we non-formalise the school and make it relevant to the lives of majority of the children in the locality and restrict the formal education, as it has been degenerated to an artificial and superficial phenomenon, to a few fundamental roles and assign the additional functions to non-formal section that would raise the standard of living and degree of excellence in one's life style?

Can we maintain coherence of various element of educational system in order to ensure continuity and mobility keeping in view the flexibility of life long education?

Can we re-organise the curriculum, and relate the contents to local needs and work out child centred pedagody for transacting the curriculum?

Can we allow the school to prepare its plan for universalisation of education and set the time frame for achieving the goal and entrust the responsibility of implementation? Panchayat, block and school complex may assist the school in working out the plan

Can we develop competencies for various segments of our population through sustained and indegenous research?

Can we provide some additional funds at the disposal of the headmaster for fresh initiatives?

Can we entrust the school with the responsibility of wiping out he practice of child labour through various socio-economic programmes and legal measures?

Can we change the teacher education curriculum keeping in view the challenges of universalisation of primary education as well as the transformation of social character of education in the context of sustainable development and improving the quality of life?

Can Early Childhood care and Education Programmes including Creche and Pre-primary be linked with the school and be made a part of its extended responsibility?

Can we pool all our resources from various sectors and sub-sectors and find out ways and means to improve the quality of grassroot education?

CONCLUSION

If it is analysed historically after independence the educational institutions have been shifted from the hands of the community to the Government and its agencies, which has resulted in various distortions such as over centralisation and uniformity in content and structure, supression of nations, rich plurality, dependence on bureaucratic culture, and disempowerment of teachers, parent and community Our National Policy on Education (1986 & revised 1992) is the bright example in this context. Our policy in the line of earlier tradition has repeated the old credo with a different time frame "It shall be ensured that free and compulsory education of satisfactory quality is provided to all children up to 14 years of age before we enter the twenty-first century" without giving any practical and realistic step that would make this a reality. It shows the elitist biases of Indian planning, where planning has been made without analysing the real needs of the community In addition to this, absence of accountability, contradiction between the stated goal and resource allocation, low social priority to the education of girl child, scheduled caste and scheduled tribes and other backward classes have led to the failure of our earlier policies and challenged the Government and non-Government agencies who are concerned with the universalisation of primary education In order to make school education available to all with equity and social justice, we have to think of a new paradigm where people would take the lead and Government would be playing a supportive role by making all the necessary resources available equitably to Panchayati Raj institutions and other non Government bodies

If we are to profit from the mistakes of the past, we have to bring about a transformation in the entire process of education We have to take a decision today and generate an alternative vision in the minds of the decision-makers, draw relevant lessons from the educational experiment of the past, establish net-working in the institutional structures concerned with education and socio-economic development, undertake campaign throughout the country and conduct researchers to find out local priorities, community perceptions appropriate for curricular and pedagogic transformation leading to a peoples movement in the light of the experiences and spirits of our "Freedom Movement," and make ourselves free from the prevailing bureaucratic culture and create a work culture. This, alternative vision would lead to the establishment of a system of education where equity, quality and universalisation of primary education would be a reality, but not a superficial phenomenon as it exists today.

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Developing Management in School

Lakshmi S.K. Iyer

Evaluation is something we implement every day as individuals and as teachers, principals and inspectors. A moment's reflection will verify that point. The skills we use to make judgements or evaluation are skills that we can transfer into a more systematic approach to evaluation. Evaluation is essentially a positive exercise because it gives value to what is there. At the same time, it does not avoid the difficult issues But like any constructive activity, evaluation should suggest ways in which educational undertakings could be improved or moved forward.

Evaluation is a team effort. It is not going to be one hundred per cent effective by calling in the "experts" and expecting them to make it all go well by the wave of a wand or muttering some technical language. Evaluation should be seen as cooperative venture between all stakeholders to find the best means of identifying the issues After all, these are the people who know the context with its energy and constraints. An outsider does not come with the solutions, but can offer another perspectives which is not as bonded to the context. But the key here is cooperative dialogue to arrive at satisfactory ends.

The basic principles of evaluation focus on accountability (e.g , judging value for money) and for development (e g , programme or professional). The former tends to be summative (i.e , carried out at the end) and the latter formative (i e , influences the development) The principles often affect what is to be evaluated and how the evaluation is undertaken

This paper will take a broad look at the place of monitoring in evaluation, what might be monitored and how it might take place, i e., the kinds of procedures used. Besides, I would like to focus on the facilitation of people-based processes rather than on pedagogic techniques or topics in order to respond creatively and with sensitivity to the demands of teacher development in their own working environments.

The aim of the paper is to give a perspective on the practical steps involved in monitoring as a form of evaluation especially in the educational field

Monitoring is a Practical Exercise

Monitoring may be seen as a practice of formative evaluation It may set in place not primarily for accountability purposes but as a feedback mechanism for a course or programme In its truly formative role it should influence the future development of the programme or course, suggesting ways to managers how it should adapt to change

Monitoring a large scale programme relies on the goodwill and cooperation of those participating and their involvement in gathering information, and in some cases acting on it. This is where management skills are important Dealing with people will require leadership skills But to sustain the evaluation, we also need communication systems. Being systematic in implementation, too, is a very important skill The monitoring programme itself may be a project within a project and so has to be managed skilfully and show the basic features of management grounded in solid principles and good practice Its aims and objectives will be linked with those of the main project itself Monitoring, itself, if it is to conform to good practice should also be subject to evaluation and periodic review, so that it remains on target and serves the needs of the project.

Evaluation is not an end in itself, but rather serves the needs of the project, programme or course. Ultimately, it serves to promote development and sustainability.

What to Monitor?

In general terms, we are looking at teaching and learning but we may also need data on a programme's impact on the social and economic life of the community or society. In the case of any innovation we have the possibility of gathering information on all relevant aspects, e.g , stakeholder satisfaction. These present a challenge to evaluators insofar as one must decide early on what the parameters and criteria of the investigation will be. Returning specifically to the teaching and learning contexts, there are a number of items that may be evaluated

What to Evaluate: Specific Areas

Materials Workplan (before teaching) in process (while teaching) and outcomes (after teaching)
Teachers and teaching Checklist, observation, developmental.
Learner outcomes. Testing, profiles, peer
Management aims: Compatibility with project aims.
Management strategies: Implementation of aims.
Innovation models and strategies. Appropriate to the context and effective in delivery.
Economic impact: Tracer studies of learners.

How to Monitor?

The procedures used in monitoring are varied. You choose the procedures which are going to yield the kind of information you need.

Evaluation does not attempt at providing readymade answers. When, as readers we engage ourselves in the problem-solving "tasks" and "reflect" on the results, we can learn by "doing."

Explanation: What has been said?—outlines the theoretical background to the topic in question.

Demonstration: What has been done?—discusses the relationship between theory and practice

Exploration: What can you do?—suggests small scale research activities teachers can carryout in the process of their own teaching.

After working through the three tasks we are convinced about the validity of the argument that there is no casual relationship between a teaching programme and test results.

Rea-Dickins and Germaine recommend formative, descriptive, data-based evaluation instead of summative, measurement-based evaluation. Generally, a distinction is drawn between *measurement-based* and *descriptive data-based* evaluation. They are outlined below:

Measurement-based	*Descriptive data-based*
The stages of evaluation procedure can be summarised in the following manner	Data collection process is summarised as follows: 1) Select your setting (e.g., primary or secondary school setting)
Establish a hypothesis	
Establish a hypothesis which	2) Identify what you wish to

is a deduction from theory and setout to test this pre-determined theory	evaluate Aim to narrow the focus of your evaluation as much as possible
Select identical groups	
Identify an experimental group who will receive the "treatment" condition and a control group which does not receive the treatment.	3) Select or design your data collection procedures.
Test the hypothesis or theory	4) Describe the data collected
In most cases a post-test is administered to both the experimental and control groups	5) Analyse these findings with reference to your initial purposes for the evaluation. (Rea-Dickins and Germaine 1992)
Interpretation of results	
Interpret the results in the light of statistical information	

One does not necessarily need to decide that an evaluation must be entirely carried out in one way or the other In fact, many think that to combine data gathering from quantitative and qualitative sources is to be recommended and provides a balanced outcome

In the field of "curriculum evaluation," a fairly standard practice has been to compare two groups of learners, that is one group which has been exposed to the new approach, with a second group which has been taught using the old approach At the end of the term, a test is administered to both the groups and the results are compared.

For example

Communicative Course	Structural Course
Learners pass the test	Learners fail the test.
(Average score = 59 per cent)	(Average score = 45 per cent)

One general interpretation of these results would be that "communicative" teaching and learning programme was successful But is this the only interpretation? Evaluation uses a range of different criteria, taking into consideration all sorts of factors derived from varied teaching and learning situations Other factors, such as the "specific teaching methodology," the individual qualities of the teacher, or the learners' exposure to English outside the classroom environment, may have resulted in the improved learner performance on the "Communicative Programme." Thus evaluation of the "process" is more challenging than the evaluation of the product

The role of teacher in the Evaluation process is to be emphasised The classroom teacher knows his class better than an external evaluator The teachers could offer various interpretations to different classroom phenomena Secondly, it is more likely that a classroom innovation or modification will be successfully implemented if the users of the innovation have contributed to its development Through a number of tasks and questions, an exploration is recommended, which only a teacher can carryout in his or her classroom

Consider the task of teaching. What aspects of your teaching might you wish to analyse further?

In this area, again, there is a wide range of issues to explore?

(1) How much time do I spend talking in the classroom?
(2) How do I correct errors?
(3) How much feedback do I give my learners?
(4) And how do I provide this feedback?
(5) How much time do I allow my learners to interact with each other?
(6) How much of my lessons do I generally spend in teacher-fronted activities?
(7) How can I improve my classroom management skills?
(8) How much attention do I actually give to individual learners?

ACTION RESEARCH

Another approach to evaluating the classroom which has gained some support over the years is action reserach (McNiff 1988). It is the kind of practical evaluation undertaken by teachers to address specific issues or dilemmas in the classroom They explore and tryout solutions, recording the undertaking for reference and for use by other colleagues Action research or problem-solving methodology may be a very useful procedure for monitoring larger programmes where involvement by teachers is desirable.

We can see the cyclic nature of this approach. To do action research one undertakes

- to develop a plan of action to improve what is already happening
- to act to implement the plan
- to observe the effects of action in the context in which it occurs, and
- to reflect on these effects as a basis for further planning, subsequent action and so on, through a succession of cycles In looking at the data collection procedure next, this consideration had been uppermost

Data Collection Procedure

In many monitoring and evaluation undertakings the following have been used in various forms

Questionnaires, e g , to parents, teachers and learners
Interviews. e.g , parents, teachers and learners
Observation. e.g , Interaction in the classroom
Diaries e.g., learners' and teachers' documentary evidence, e.g , reports
Testing. e g , learner outcomes.
Action research e.g , problem-solving in the classroom

An evaluation of specific issues will invariably *raise* a number of other and different issues, which could be wide ranging While solving existing problems, it can *add* new problems Therefore, classroom evaluation will raise issues other than that being investigated initially

Very often we use questions as interventions through which we offer evaluation and feedback to our students, trainees and peers.

The effectiveness of these interventions, however, depends to a large extent on our awareness of the directive and facilitative skills involved in the use of questions.

Prescriptive (giving direction)
Informative (giving information)
Confronting (challenging supportively)
It could be facilitating also
Attending to feelings
Encouraging self exploration
Supportive (enhancing self-esteem)

These served as the basis for tasks that helped us identify our typical forms of interactional behaviour and extend our awareness of the intentions behind our interventions

A model of skilled helping may be evolved This model of skilled helping deal with confronting a trainee or colleague supportively and making them aware of their damaging behaviour without however negatively affecting the psyche of the concerned individual

Gaining awareness of the personal atmosphere that a teacher brings to her classroom and working from the agenda of the other, may be particularly useful as well as interesting.

Personal Atmosphere

The teachers will not change their performance unless they themselves see a discrepancy between what they want to achieve and what they are actually achieving The focal point is the role played by the teachers' own personalities in developing their teacher capacities, both personal and professional. Personal atmosphere could mean the psychological learning atmosphere established, the way a teacher comes across to the students, the influence of students' behaviour on teachers and many other characteristics as unique to each of us as is our signature

(i) Awareness of ourselves helps us discern how our teaching affects learning;
(ii) personality is constantly developing provided that awareness is at work;
(iii) whether good teachers are born and made, they continue to make themselves.
(iv) changes in a teacher come from within her/his subjective field of experience.

The inherent question is how does one form an opinion of ourself that is more or less accurate without fantasy or distortion? A partial answer to this question lies in relating to teacher competence; but what we need to pursue further is to assess how our attitude towards ourselves, others, authority and learners influence our personal atmosphere and thereby affect learning

CONCLUSION

Monitoring is an important part of professional lives of those involved in education especially if it is formative and developmental in orientation. The spirit in which evaluation is undertaken is also crucial: a bureaucratic exercise will only result in lost energy and time; a perfunctory exercise will only satisfy the needs of paper pusher, but a committed evaluation will yield outcomes which positively affect the participants as well as the curriculum and programmes and eventually the community

An Evaluation of Primary School Curriculum for Tribal Children of Orissa

S.P. Pati

The study evaluates the curriculum of the primary level with respect to its uniformity and relevance for tribal groups and to suggest ways and means of improving it

A questionnaire was developed to collect data from primary teachers, from 15 primary schools, randomly selected from two tribal districts

The findings indicate that tribal and non-tribal schools follow same curriculum, and the curriculum is not suitable for the tribal children There was no relevance of the activities included in the curriculum for tribal children The author has recommended that separate curriculum should be developed for tribal primary school children, which should include activities that are related to their environment such as, agriculture, animal husbandry, preservation of forests, collection of forest products and their marketing.

NEED AND IMPORTANCE OF PRIMARY EDUCATION

India is second most populous country in the world and constitutes about 16 per cent of the world population Recorded as 84 63 crores in 1991, the population figure would be approaching 90 crores at present The percentage of literacy as per 1991 Census was 52.1 and about 48 per cent of our people are still illiterate The directive principles of the Constitution of India (Article 45 and 46), has vested on us a sacred obligation of assuring that, all children who attain the age of 14 years will be made literate by 1960. On the similar line the preamble to the world declaration on Education For All proclaimed by the World Conference on Education For All held in March 1990 at Jomtien, Thailand, states "More than 40 years ago the nations of the world speaking through the Universal Declaration of Human Rights, asserted that 'every one has right to education' Despite notable efforts, many nations including India are much away from this target." The Education Commission (1964-66) recommended that, percentage of literacy should increase to 80 by 1976 and that illiteracy in the country should be liquidated by 1986. But 30 years after the bold recommendation of the Education Commission, the achievement is nowhere near the goal

The revised National Policy on Education (1992) envisaged the launching of National Mission for achieving the universalisation of Elementary Education and to bring total literacy to the country. Illiteracy and poverty are directly related to each other. Illiteracy breeds poverty. But every year some thousands of children in the age group of 6-14 are added to the illiteracy mass on the way of either non-admission or dropout from the primary schools for whom either Non-Formal Education or Adult Education is required

NEED FOR THE PRESENT STUDY

India has made remarkable progress in several human development indicators. But unfortunately its achievement in universalisation of Elementary Education continues to be dismal To achieve universalisation of Elementary Education, the National Mission is making enrollment campaign throughout the country But as stated earlier every year a bulk of children in the age group of 6-14 are not entering or dropping out from the primary level and adding to illiteracy percentage of the country.

The Fifth All India Educational Survey published by the NCERT, New Delhi, confirms that, the hard core of children not enrolled or dropping out from the primary schools are from Scheduled Castes and Tribes. The Census Report 1991 speaks that about 22 per cent of the total population of Orissa are tribes and the percentage of literacy is only 22.3 as compared to 48 5 per cent for the whole State It is mostly due to non-enrollment and dropping out at the primary level. Out of the several other factors, suitability of curriculum is a major factor to arrest wastage at the primary level. As such need was felt to explore the relevance of prescribed primary school curriculum for the tribal children of the State of Orissa.

OBJECTIVES

As the nature of the problem indicates the present study has been designed with the following objectives.

(i) To know whether the prescribed curriculum is fully/partly same, or different for the tribal and non-tribal primary school children

(ii) To explore the relevance of the prescribed primary school curriculum for the physical, cultural, mental, social, moral, etc , development of the tribal children.
(iii) To ascertain whether or not the prescribed curriculum has been prepared according to the needs and interests of the tribals.
(iv) To suggest measures for modifications of the curriculum in the light of the findings

SCOPE AND DELIMITATION

The State of Orissa is very vast. As per the Census report of 1991, the districts inhabited by more than 50 per cent tribes were (i) Mayurbhanj (ii) Koraput and (iii) Sundergarh. Out of these three districts, Sundergarh district is thickly covered with factories and the biggest steel plant of the State. So the investigator decided not to include this district in the sample as the tribal culture might have been affected by the industrial culture. Hence the investigator took sample from the Mayurbhanj district, situated in the extreme northern part and Koraput district situated in the extreme southern part of the State, for better study The details of the schools and the teachers have been given in the sampling.

TOOLS AND TECHNIQUES USED TO COLLECT DATA

The investigator in consultation with some experts prepared a draft questionnaire to collect data from the primary school teacher, with respect to relevance of the prescribed primary school curriculum for the tribal children. Then the draft questionnaire was shown to some experienced Sub-Inspector of Schools and experienced primary school teachers.

After receiving the valuable suggestions the necessary modifications were made in the questionnaire and the final questionnaire was prepared for collecting responses from the primary school teachers The English version of the questionnaire has been given in Appendix A.

SAMPLING

The questionnaire for the teachers were administered on 20 teachers of 15 primary schools, randomly selected from Koraput district and 20 teachers of 20 primary schools, randomly selected from Mayurbhanj district in which all or more than 60 per cent children belonged to tribal community All these schools are located in the areas thickly populated with tribes The data were collected through personal contact with the teachers.

ANALYSIS AND INTERPRETATION

The data gathered through the questionnaire have been analysed item-wise below to get a better picture about the relevance of primary school curriculum for the tribal children. Since item numbers 1 and 2 of the questionnaire were for the general information, these two have not been analysed.

SIGNIFICANCE OF PERCENTAGE

Using the formula for significance of percentage given in Garrett (1966, p. 197) in the present study with 40 teachers as sample, the responses (to a particular query) given by 65 per cent to 68 per cent teachers will be significant at 0.95 confidence level and the responses given by 69 per cent and above teachers will be significant of 0.99 confidence level, i.e., will never be less than 50 per cent.

ANALYSIS AND INTERPRETATION OF THE ITEMS

ITEM NO. 3 Curriculum for the tribal and non-tribal primary school children
Living style, culture, tradition etc have tremendous effect on the education of children. The living style, culture tradition of the tribal children differ significantly from non-tribal children Hence the primary school curriculum for the tribal children should also differ from that of non-tribal children. But all the 40 (100 per cent) teachers significant at 0.99 confidence level, informed that, they were following the same curriculum both for the tribal and non-tribal children

ITEM NO 4 Age of the tribal children and primary school curriculum
The psychologists and educationists are of opinion that, the curriculum should be prepared strictly according to the age of the children. But 8 (20 per cent) teachers were of views that, primary school curriculum for the tribal children was prepared according to the age of the children and 32 (80 per cent) teachers, significantly at 0.99 confidence level, were of views that, it was not prepared according to the age of the tribal children, which is unpsychological.

ITEM NO. 5 Day-to-day work of tribal children and primary school curriculum
If the topics included in the curriculum are helpful for the tribal children in their day-to-day work, then they will eagerly learn those topics. But only 10 (25 per cent) teachers were of views that, a few topics included in the curriculum were helpful in the day-to-day work of the tribal children whereas 30 (70 per cent) teachers, significant at 0 99 confidence

level, were of views that, not a single topic of the curriculum was helpful in the day-to-day work of the tribal children

ITEM NO 6 Surrounding environment of the tribal children and primary school curriculum

The educationists are of opinion that, sorrounding environment has a tremendous effect on the teaching learning process That is why they advocate to prepare curriculums for the pupils in consideration to the environment in which they live in But 9 (22 5 per cent) teacher were of views that, the surrounding environment was partially considered and 31(77 5 per cent) teachers, significant at 0 99 level, were of views that, surrounding environment was not at all taken into consideration while preparing primary school curriculum for the tribal children.

ITEM NO 7 Provision of games, sports, songs, dances etc , for the tribal children in the prescribed curriculum

Generally the children are found in fond of games, sports, songs, dances, etc. This is more prominent with tribal children as, these are their cultural heritage. Hence these aspects should form the integral part of the curriculum for the tribal children. But 36(90 per cent) teachers, significant at 0.99 confidence level, were of views that, there was no provision for games, sports, songs, dances,etc liked by the tribal children in the prescribed primary school curriculum

ITEM NO. 8 Provision for agriculture, animal husbandry, etc , in the curriculum

Agriculture and animal husbandry are two major income sources for the tribals. Hence the tribal children need to learn the modern techniques of agriculture and animal husbandry. But it was found that 38(95 per cent) teachers significant at 0.99 confidence level, were of views that, the curriculum prescribed for the primary school children did not provide any scope for agriculture and animal husbandry

ITEM NO 9 Provision of the topics like preservation of forests, collection and marketing of forest goods, etc , in the curriculum

The children live in the forest area They collect wood, honey, different fruits, etc., from the forest and sell those in the market. They should know how to preserve forest, collect forest products in different seasons and properly market the forest products But it was found that, 37(92 5 per cent) teachers, significant at 0.99 confidence level, were of views that, the primary school curriculum did not contain topics related to preservation of forest, collection and marketing of forest products etc , which tribal children need to know.

ITEM NO 10 Comprehendness of the topics in the curriculum

The different topics included in the curriculum should be comprehendable by all categories (weak, average and bright) of the tribal children, so that maximum children will be benefited. But 34(85 per cent) teachers, significant at 0 99 confidence level, were of views that, a few topics included in the curriculum were comprehendable by all categories of tribal children, whereas 6(15 per cent) teachers were of views that, not a single topic included in the curriculum was comprehendable by all categories of tribal children.

ITEM NO 11 Suitability of the topics to adjust the tribals with the changing time.

Due to massive explosion in the field of science and technology, the living style is changing very rapidly. The curriculum should contain topics to adjust the tribals with the changing time. But 30 (75 per cent) teachers, significant at 0.99 confidence level, were of view that, the topics included in the curriculum were partially helpful to adjust the tribals with the changing time.

ITEM NO 12 Helpfulness of the topics for the moral and spiritual development of the tribal children.

Every body says that, there has been deterioration of moral and spiritual values with majority people due to faulty education system. Many advocate to include suitable topics in the curriculum, those will inculcate moral and spiritual values among children But in the present study 20(50 per cent) teachers were of views that, the topics included in the primary school curriculum for the tribal children were partially helpful and rest 20(50 per cent) teachers were of views that, the topics included in the curriculum were not at all helpful for the moral and spiritual development of the tribal children

ITEM NO. 13 Work oriented topics in the curriculum.

Practical knowledge is far better than theoretical knowledge. A person gets practical knowledge and skill when he does a work by himself. This helps him to work and maintain his livelihood independently That is why the committees and commissions have recommended for work oriented studies. In the present study 8(32 per cent) teachers were of views that, the topics included in the primary school curriculum for the tribal children were partially work oriented and rest 32 (80 per cent) teachers, significant at 0.99 confidence level, were of views that, the topics included in the primary school curriculum for the tribal children were not at all work oriented

ITEM NO. 14 Needs of the tribals and curriculum

If the curriculum provided topics those will cater to the needs of the tribal children at present and in future, they will be eager to learn those topics. In the present study 30 (75 per cent) significant at 0 99 confidence level, teachers were of views that, the topics included in the primary school curriculum for the tribal children did not cater to the needs of the tribals.

THE MAJOR FINDINGS OF THE STUDY

1 Same curriculum was followed for the tribal and non-tribals primary school children.

2 A significant percentage (80 per cent) of teachers were of views that, the curriculum followed for the tribal primary school children had not been prepared according to the age levels of the tribal children.

3. A significant percentage (75 per cent) of teachers were of views that, not a single topic, included in the primary curriculum was of use in the day to day works of the tirbal children.

4. A significant percentage (77.5 per cent) of teachers were of views that, the surrounding environment had not at all been taken into consideration while preparing the curriculum for the tribal children.

5 A significant percentage (90 per cent) of teachers were of views that, there was no provision for games, sports, dances, songs, etc in the curriculum prescribed for the tribal children.

6. A significant percentage (95 per cent) of teachers were of views that, there was no provision for agriculture, animal husbandry, etc., in the curriculum prescribed for the tribal children

7. A significant percentage (92.5 per cent) of teachers were of views that, the prescribed curriculum did not contain topics like, preservation of forests, collection of forest products and their marketing etc., which tribal children need to know.

8 A significant percentage (85 per cent) of teachers were of views that, a few topics included in the curriculum were comprehendable by weak, average and bright tribal children.

9 A significant percentage (75 per cent) of teachers were of views that, the topics included in the curriculum were partially helpful to accommodate the tribals with the changing time.

10. Fifty percentage of teachers were of view that, the topics included in the primary curriculum were partially helpful and rest 50 per cent of teachers were of views that, topics included were not at all helpful for the moral and spiritual development of the tribal childrens

11. A significant percentage (80 per cent) of teachers were of views that, the topics included in the primary school curriculum for the tribal children were not at all work oriented.

12. A significant percentage (75 per cent) of teachers were of views that the topics included in the prescribed curriculum were not selected so as to cater to the needs of the tribal children.

RECOMMENDATIONS

In the light of the findings the following recommendations may be made:

1. As it was found that, same curriculum was followed for both the tribal and non-tribal primary school children, it may be recommended that, steps may be taken to prepare separate curriculum, specifically meant for the tribal primary school children.

2. As a significant percentage of teachers were of views that, the age, day-to-day work, sorrounding, capacity to learn and needs of the tribal children had not been taken into consideration while preparing the curriculum for the tribal primary school children, it may be recommended that, steps may be taken to review the curriculum and modify it to suit to the age, day-to-day work, sorrounding, capacity to learn and needs of the tribal children.

3. As a significant percentage of teachers were of views that, topics like games, sports, dance, song, agriculture, animal husbandry, preservations of forest, collection of forest products and their marketing were not found in the prescribed curriculum, it may be recommeded that , stpes may be taken to include these topics in the curriculum as these topics are essential for the all-round development of the tribal children.

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APPENDIX A

Questionnaire for the Teachers Serving in the Primary School

Information: Kindly fill-up the blanks or put a cross (X) mark on the answer applicable to you, your school and tribal children

1 Type of your school. Only for Tribal Children/both for triabl and non-tribal children.

2 Number of children in different classes

	Tribal	Non-tribal
I		
II		
III		
IV		
V		
Total .		

3	Does the curriculum followed in your school same for both tribal and non-tribal children?	Yes/No
4	Has the curriculum been prepared for the primary level according to the age of the tribal children?	Yes/No
5	Are the topics included in the curriculum related to the day-to-day work of the tribal children?	All topics/Some Topics/No Topic
6	Has the curriculum been prepared considering the surrounding environment of the tribal children?	Fully/Partially/Not at all
7.	Is there any provision for games, sports, dances, songs, etc., in the curriculum prescribed for the tribal children?	Yes/No
8	Is there any provision for agriculture, animal husbandry, etc , in the curriculum for the tribal children?	Yes/No

9.	Does the prescribed curriculum contain topics like preservation of forest, collection of forest products and their marketing, etc, as required for the tribal children?	Yes/No
10	Are the topics included in the curriculum comprehendable by the weak, average and bright tribal children?	All topics/Some topics/No topic
11.	Are the topics included in the curriculum suitable to accommodate tribals with the changing time?	Fully/Partially/Not at all
12	Are the topics included in the curriculum helpful for the moral and spiritual development of the tribal children?	Fully/Partially/Not at all
13.	Are the topics included in the curriculum work oriented?	Fully/Partially/Not at all
14	Are the topics included in the curriculum been selected to cater to the needs of the tribals?	Yes/No

Effect of Activity-based Teaching-cum-Evaluation Strategy on Child Achievement and Retention

B. N. Panda

The study evaluates the effect of systematic activity-based teaching-cum-evaluation strategy on attainment of learning and the gains from this method as against the traditional method, and the effect of this strategy on retention of learning The sample included all grade one students in 1993-94 and 1994-95 sessions The tools included 5 criteria referenced Unit Tests It was a post-test design study. The unit-wise testing was done with tests developed and remedial instruction was given The results indicated that achievement of the experimental group with activity-based teaching was much higher, and more than 85 per cent children attained mastery This strategy was better than traditional method and led to better retention

INTRODUCTION

On the eve of the twenty-first century, intense thought and discussion is being devoted to the future of human society. On every occasion, the importance of children education, has been given high priority although 70 per cent of our primary schools are understaffed and ill-equipped. It is a fact that primary education is the first exposure of the child to this world and prepares him/her to stand alone away from parental protection and to be a good citizen and acts as a base for further education But the children coming from primary schools are not reaching the expected learning outcome today which lead to educational backwardness and hinder the path of progress. It is now understood that the quality of students achievement is deteriorating day by day due to unsuitable curriculum and defects in the curriculum transaction in schools. Thus to ensure quality and equity in education for all children at primary stage new mechanism like MLLs in terms of the achievement of terminal competencies (NCERT, 1995) has been fixed and it is expected that every child passing out of the school or non-formal system must acquire and master minimum competencies by the end of each grade. Therefore, determined efforts have been made towards the achievement of his goal and to do so many approaches have been developed namely, activity-centred, child to child learning, collaborative learning, competency-based teaching, Piagetian approaches, playway method and MLLs approach to teaching and learning to enhance the learning achievement of the learner

Review of research studies revealed that changing scenerio in school, alternative curricula and new innovative teaching strategy like activity-centred approach had positive effects in students achievement (Leckheed & Lengfield 1991, Bashir 1992; Bondi 1991, Agnihotri et al 1994; Chattopadhyay et al 1994, Kishore 1994; Padhi 1996). Thus, it was thought worthwhile to examine the effect of systematic activity-based teaching-cum-evaluation strategy in the present educational set-up to measure the learning outcome and retention of class I students, hence this study

OBJECTIVES

The main objectives of the study are.

1 To study the effect of systematic activity-based teaching-cum-evaluation strategy on attainment of learning materials in mathematical concept
2 To compare the effect of systematic activity-based teaching vs. traditional method on achievement of mathematical concept
3. To find out the effect of systematic activity-based teaching-cum-evaluation strategy on retention of learning materials in mathematical concept

METHODOLOGY

Sample

The sample for the study was taken from the BPDM School of Bhubaneswar city in Orissa. All the grade I students (20 in each session) studying in the 1993-94 and 1994-95 academic sessions were considered for the study.

Tools used

For measuring the learning outcome, five criteria referenced unit test along with an overall criterion referenced test were developed by the investigator from the book prescribed for class I students by the CBSE.

Design

The reported study followed a post-test experimental design only. All the students of class I studying in 1993 and 1994 sessions were considered as control and experimental group and the activity-based method and achievement scores were independent and dependent variables respectively.

Procedure

From the very beginning of the 1993-94 academic session the teacher teaching mathematics in grade I was asked to test learning performance of students unit-wise and overall achievement on the basis of developed criterion referenced unit test and overall criterion referenced test. But in the 1994-95 academic session the teacher was trained to teach mathematics differently on the basis of systematic activity-based method. At the end of instruction of every unit the criterion referenced test was administered. The children who were found to secure less than 80 per cent of marks were given remedial instruction and re-tested by a parallel form. Like this it continued till the completion of all the units At the end of instruction an overall criterion referenced test was administered to measure the overall achievement of students. To measure the retention of learning materials the criterion achievement test was readministered after one month of the completion of the last testing. While the first group of students were called control group, the students studying in 1994-95 session were called experimental group for the study

Statistical Techniques Applied

To find out the meaningful interpretation of the raw scores the data was analysed with the help of "t"-test and graphical representation.

Results and Discussion

The results of the study are presented on next page:

TABLE 1
"t" Ratio in Respect of Percentage of Experimental and
Control Group on Unit Test

	Experimental Group % of mastery level	*Control Group % of mastery level*	*"t" values*
1. Unit I & Unit II	90.6	80.2	6.37*
2. Unit III & Unit IV	92.8	74.6	9.18*
3. Unit V and Unit VI	91.5	81.0	9.33*
4. Unit VII and Unit VIII	85.0	65.4	10.10*
5. Unit IX and Unit X	88.7	72.3	8.48*
6. Overall achievement	91.8	78.2	8.75*
7. Retention	89.3	77.9	7.03*

* Significant at 0.01 level.

The results of Table 1 and Figure 1 indicate that there exist significant difference in the attainment of mastery level in the unit-testing between the experimental and the control group. While the control group has attained mastery level only in the first (80.2) and third (80.1) unit testing the experimental group has attended in all the tests and also in overall achievement. When "t" test was applied to find out the difference between the groups, it was noticed that all the six CPS are significant in respect of the experimental group. Thus it can be concluded that children taught through activity-centred method can remarkably perform better and have higher percentage of masters as compared to traditional method. Similarly, it was also found that the experimental group possess better retention than the counterparts. Thus to have a more meaningful interpretation of the data the results of the study are also given in the figural form.

MAJOR OUTCOMES/FINDINGS

1. The learning achievement of experimental group do differ significantly from control group in every unit as well as in overall achievement performance. It was also noticed that in the experimental group mastery learning has been attained by more than 85 per cent children in all the units as well as in overall achievement than the control group.

2 It was found that systematic activity-based teaching-cum-evaluation strategy was a better approach than the traditional method in developing mathematical concept.

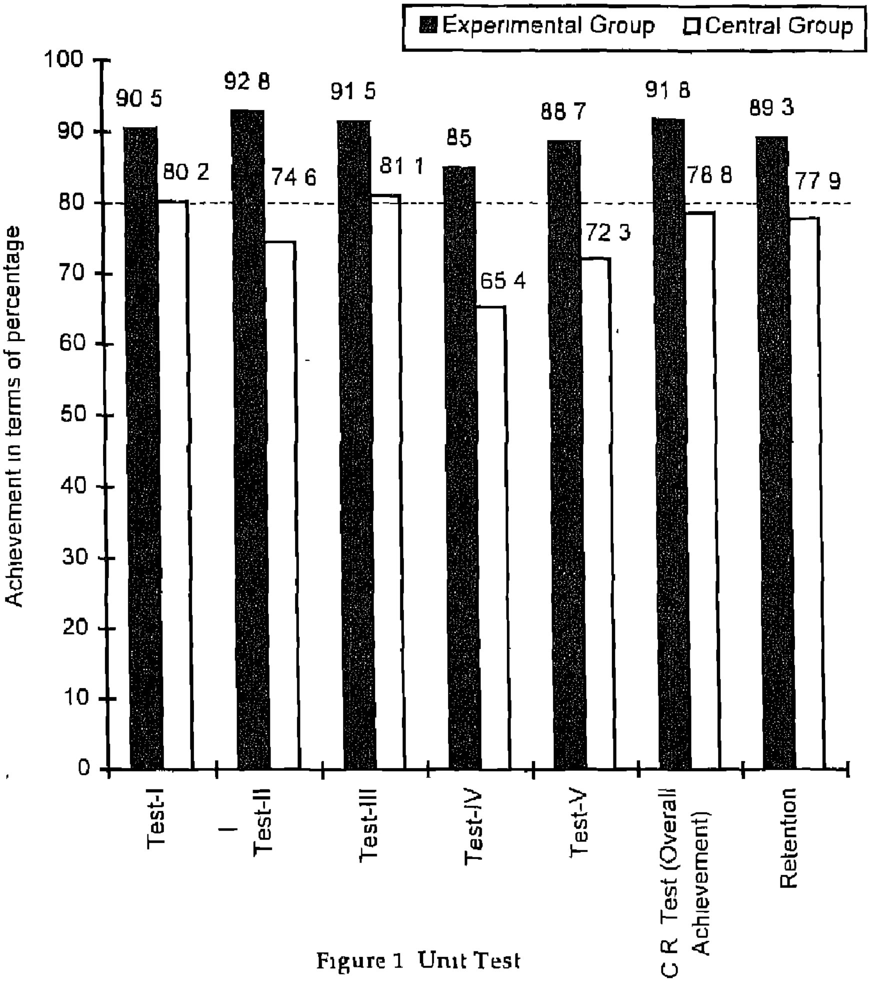

Figure 1 Unit Test

3. The students of experimental group were better in retention of learning materials than the counterparts

CONCLUSIONS: EDUCATIONAL IMPLICATIONS

It is a fact that primary education is the first exposure of the child to this world This education prepares him/her to stand alone away from parental protection and act as a base for further education. It is now acknowledged that UEE can not be achieved unless children passing out of the school or non-formal system acquire a minimum level of learning The NPE, 1996 was reviewed in 1992 and the revised policy formulations fixed that the goal of UEE would be achieved by the turn of the century as a part of the commitment for Education For All (EFA). Thus, it can be said that systematic activity-based teaching-cum-evaluation strategy can help to achieve UEE and quality primary education and is more effective than the traditional approach.

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Interpersonal Skills Used by Heads of Primary Sections of Performing and Non-Performing Secondary Schools

Indu Khetarpal

Criteria for identifying performing and non-performing schools, and to find out if some significant differences exist between the two types of schools were evolved through intensive reivew of literature, which include: (1) results of class XII public examination, (2) students' satisfaction with teaching-learning process, (3) teachers' perception of school climate, (4) unit cost per student, (5) performance in sports and co-curricular activities, (6) District Education Officers' Assessment, (7) parents' satisfaction with the institution 20 schools (7 Government Aided and 9 Private) were selected through purposive sampling from south-west Delhi The investigator used one standardised tool, SPIRO (Style Profile of Interaction Roles in Organisations) by Udai Pareek, and developed an adapted version of Styles Profile of Interaction Roles of Heads of Schools (SPIRHOS).

It was found that heads of performing schools were using interpersonal skills which helped in generating congenial environment and minimising constraints on learning They also encouraged the staff and students to develop and provide necessary conditions for continuous improvement and professional growth, besides employing analytical approach to problem solving. The heads of non-performing schools were found wanting in these regards. Also it was found that Delhi's primary head masters of performing schools were adaptive and generative learners, while the heads of non-performing schools were only the adaptive learners

INTRODUCTION

Skills of heads of primary schools is a neglected area of research, more so when it comes to interpersonal skills which, there are reasons to believe, can dramatically improve organisational performance A number of studies have been attempted on the skills of heads of secondary schools but few research studies have been reported on heads of primary institutions, inspite of the fact that foundations of an educational system are laid down there.

Neglect in this important area of research can be corroborated by quoting the number of studies in a section of a well-known recent survey on educational research (Buch 1988) which reports over twenty research studies on senior secondary headship but only one or two on primary school headship. In this paper an attempt has been made to bridge this gap, though to a limited extent. In particular, it proposes to confirm whether interpersonal skills of heads of primary sections of performing secondary schools are different from those of heads of primary sections of non-performing secondary schools.

INTERPERSONAL SKILLS: AN ESSENTIAL COMPONENT OF THE PROCESSES THAT LEAD TO SCHOOL PERFORMANCE

School performance is a judgement that is made about the relation between the performance of an institution and the expectations of a larger social order of which it is a part. The crucial difference between performing and non-performing organisations is strongly surmised as the expected performance of the people working there. In all probability, good interpersonal relations amongst the critical social actors in that organisation will support performance to meet the expectations of the larger social order, thus enabling the school to earn the distinction of a performing institution. Poor interpersonal relations amongst the critical social actors in that organisation will come in the way of performance, getting it labelled as a non-performing school.

Obviously heads of schools will be performing crucial role in facilitating or otherwise, effective interpersonal relations amongst the critical social actors. Such a role of interpersonal skills of heads in school performance gets highlighted by the following research support/points.

- Institutions are complex organisations composed of interdependent parts, governed by various established rules and norms of behaviour adapted for stability and growth (Clubb 1988). An educational institution is an extra-sensitive network of such interconnected relations. Performance in such an interdependent as well as sensitive entity is unlikely to be significantly improved by any set of measures that fail to recognise the importance of effective interpersonal relations amongst the critical social actors who work in the institution If organisational values and ethics, politics and authority, are considered as important and realistic dimensions of interpersonal relations (Anderson 1988), then a realistic understanding, in that light, of individuals and groups forming the organisation, can be counted as a basic component of successful school management Dynamaic interactions that take place during the processes of planning, organising, motivating and controlling within and outside the classroom—which engulf the teachers, the students, the non-academics, the community around, etc , to quite an extent thus, will revolve around the interactional skills of the head of the school.

A goal of many organisations which want to perform, is to get the sub-systems of the school highly involved in their work through improvement groups. The role of the headship is to establish more rational and effective linkages, between different levels of the school organisation. This shift from traditional top-down approach to new forms of performance based management is recommended by strategic researchers like McGregor, Likert and Argyris who advocate that headships re-examine many of the values and assumptions they make about the different sub-systems of the school and how they should be managed. Hence for managing performance in a school, it becomes imperative to understand the complex motivational patterns of the staff in their teaching assignments, as all educational management assumptions and bahaviours are likely to affect these Interpersonal skills have their own place, for obtaining such an understanding.

Interpersonal relations in school organisations perhaps have shifted toward cooperation, openness in decision-making and an emphasis on performance based on staff-headship trust. One of the roles of headship of the performing school is focused on begetting trust and retaining trust of the sub-systems of the school as an organisation. In high trust teams, the norms of reciprocity include expressing differences of opinion, stating feelings of encouragement and disappointment, sharing information, exploring ideas outside one's own function, providing high give and take, and giving support. For the low trust teams the opposite was implied (Barnes 1981) Trust can not be built by the institutional leadership without being deft in interpersonal skills.

Interpersonal sensitivity of an administrator as part of his/her interpersonal skills enables him/her to·

(a) ensure that all staff/students contribute to team management of goals.

(b) develop and influence the staff/students by being transparent in his/her behaviour

(c) know what motivates the individual staff/students as well as what turns them off, and

(d) understand the strengths and limitations of the staff

- The headship is responsible for the performance of the staff, who must relate to the students in a way that motivates and guides them towards organisational goals If the school head is to achieve his/her goal of improving curriculum programme he/she must have an understanding of the teacher and the teacher's impact in the classroom and must always be prepared to work effectively with the teacher for improving that impact (Musaazi 1982). The headship's role implies involvement in, and knowledge about what goes on it the classroom including the curriculum, teaching strategies and the monitoring of pupil progress (Rutter et al. 1979; Mortimore et al. 1968). This requires support to the students through the teachers, including both encouragement and practical assessment (Levine & Stark 1981; Murphy 1989). It involves the headship projecting a "high" profile through actions, such as frequent movement through the school, visit to the classroom and informal conversation with the staff (Sizemore et al. 1983, Mortimore et al 1988, Pollack et al. 1987, Teddlie et al 1989). It also requires assessing the way teachers function. The influence and impact the headship has on student achievement level and progress is likely to operate indirectly rather than directly through his/her interpersonal skills which are likely to influence school and staff culture as well as attitudes and behaviours of all involved in the achievement of goals
- Through the interpersonal skills one can assess the headship and his or her job, i.e., whether he is an expert, protector, facilitator or innovator or a combination of all these Further, one can assess how well he/she performs the leadership functions of strategic thinking, implementing policy, building teams and alliances and creating a high performance process within and outside the classroom.
- The head of a school who cannot meet others at an interpersonal level and build working relationships carries a heavy handicap. It is important for the head of the institution to be aware of "how" they interact with others and the effects of their styles on their own and others performance. The interpersonal style of the head of the school thus becomes a means of predicting performance and of pinpointing and correcting problems and deficiencies in the organisation.

Summing up from what has been listed above, it seems that interpersonal skills used by heads of schools have an important place in the scheme of things related to performance or non-performance, on the following points·

1. Since educational institutions as complex organisations composed of interdependent parts require extra-sensitivity on the part of the

head of the school, his/her interpersonal skills will have a place in the performance or non-performance of the school

2 A goal of any educational organisation is to establish more rational and effective linkages between different levels of the organisation and get the sub-systems of the school highly involved in their work. Headships may achieve this by using the skills in question
3. Interpersonal skills of headship may be an essential component of the processes that lead to staff-headship trust building exercises, leading to better performance.
4. Interpersonal sensitivity of headship helps in diagnosing the school environment.
5. It seems reasonable to surmise that, through the effective use of interpersonal skills, the headship influences the processes within and outside the classroom.
6. The headship's role as a leader of the institution may be assessed by his use of interpersonal skills
7. If the headship is not competent in building working relationships, it may be a handicap.

Therefore, it will be a sound hypothesis to test that interpersonal skills of heads of primary sections of performing secondary schools will be different from those of heads of primary sections of the non-performing secondary schools. The present paper empirically tests this hypothesis and reports the findings.

OBJECTIVES OF THE STUDY

Keeping in view the issues listed above, the following main objectives of the study were formulated:

1. To develop criteria for identifying "performing" schools
2. To identify the performing and non-performing schools on the basis of the criteria developed
3. To scale and study the interpersonal skills of the heads of primary sections of performing and non-performing secondary schools.
4. To examine the difference between the interpersonal style of the headships of the primary sections of performing and non-performing schools, thus scaled.

SCHOOL PERFORMANCE AND NON-PERFORMANCE: CRITERIA DEVELOPED

Some researchers are of the viewpoint that, while all reviews assume that performing schools can be differentiated from non-performing ones, there is no consensus yet on just what constitutes a good performance in a school (Van de Ven & Ferry 1980; Bluedorn 1980; Reid, Hopkin & Holly 1987) Others who refer to organisational goals as being manifestations of individual preference and values, take these goals as the best criteria for measurement of performance. Another view is that there is a need to focus on student outcomes, particularly the concept of the "value added" by the school.

To develop and communicate a value that "embodies a sense of purpose and mission" (Anderson 1988, McPherson 1992) the following criteria for measuring school performance were used in the present research study:

1. School Image: Results of Class XII Public Examination
2. Students Satisfaction with the Teaching-Learning Process
3. Teachers' Perception of the School Climate
4. Unit Cost Per Student
5. Performance in Sports and Co-curricular Activities
6. "District" Education Officer's Assessment of the School
7. Parents Satisfaction with the Institution per se.

PERFORMING/NON-PERFORMING SCHOOLS: JUSTIFICATION FOR THE CRITERIA USED

This section provides brief justifications for each of the criteria listed above, used in the study for developing the school performance index. It also includes, very briefly, the instruments or methodology used for quantifying these criteria. One by one, the justifications etc are as follows.

1. School Image: Results of Class XII Public Examination

Academic results of a school, particularly at the terminal year of schooling, at a public examination are considered, at the outset, one of the most important and "time-tested" dimensions of a school's performance image. Consistency in such an academic performance, year after year, is further considered as a supplementary criterion for the same.

Research studies by Brookover (1979) showed that schools can make a difference in student achievement. Student performance at a public examination is often used to describe school success In a study of relationship between principals' performance and students' achievement, it was found, for example, that factor scores on leadership, instructional management and teacher-relations have a direct impact on student achievement (1984).

In the present study, the academic record of the last three years of class XII public examinations, starting 1993, was taken as one criterion for the school's performance image. This criterion was accepted on the promise that primary sections of a school can not get the name of a performance section unless the "whole" school image gets so.

The data for the purpose was obtained from the school records An average of the three years performance at the public exmınations namely, Central Board of Secondary Education (CBSE) results for 1993, 1994, 1995 served as the first criterion. A school was counted as "performing," if this average came to 60 per cent and above; the figure of 60 was considered appropriate in relation to the national average of such results.

2. Students' Satisfaction with the Teaching-Learning Process

Students' satisfaction with what academic and non-academic activities go on in the school, can be counted as one dimension of school performance If the students are satisfied with the work which goes on in their classrooms, then there is a likelihood of the children of the school being fully integrated into all aspects of its working processes. The full involvement of children in these processes can be viewed as an important contributor towards school performance (West-Burnham 1992)

A "satisfaction scale" based on a number of bipolar adjectives (on the lines of semantic differential technique) was used for the purpose. This scale was adapted from TAPE FORM B (Jindal's adaptation of Pervin's *Transactional Analysis of Personality and Environment,* 1967) used for gauging students' satisfaction with their school activities and environment. The scale used in the study was named as "Students Satisfaction Scale." The scale consisted of twenty bipolar adjectives (Srivastava 1983), each to be rated on a seven point scale. The sum of the scores of ratings on each of the twenty bipolar items averaged over the responses of ten students sampled purposively, gave the over all satisfaction score for the institution.

Ten primary students of each school in the sample were personally administered this scale to elicit their rating scores Personal administration was adhered to explain, where ever necessary, the meanings and intent of the questions to the primary school children

3. Teachers' Perception of the School Climate

Organisational climate is a set of characteristics that describe an organisation, distinguish it from other organisations and influence the behaviour of people in it relatively, enduring over a period of time (Campbell, Dunnette, Lawler, & Weick 1970). Behaviour of head of a primary school has often been found significantly related to the school climate which in turn has been found related to the performance of the school (Sharma 1982; Jindal 1976; Halpin & Croft 1963). School climate is assumed to have a vital effect in the accomplishment of the school objectives.

The scale for measuring Teachers' Perception of the School Climate was also adapted from TAPE FORM B (Jindal's adaptation of Pervin's *Transactional Analysis of Personality and Environment*, 1967) used for gauging teacher's perceptions with their school activities and environment. This scale was also based on the semantic differential technique using bipolar adjectives. The overall climate score for the institution was obtained by the sum of the ratings on twenty-five bipolar adjectives (Srivastava 1983), on seven scales, for each of the four concepts, viz, "my school," "students," "faculty," and "administration" which were taken (also by Jindal) as the main constituents of the school climate criterion.

Five primary teachers of each school in the sample, purposively chosen, were administered this scale to elicit their rating scores.

4. Unit Cost Per Student

Performing schools, of the type included in the study, most probably function in such a manner that gives financial returns if not more, atleast in proportion to the investments made in the form of various inputs The school organisation should work for maximum value addition (output), with the help of precesses that contribute to efficiency in the use of men and material resources. A well functioning school raises the quality of its output, i.e , student academic and general growth with minimal of.effort and expenditure by better and optimal utilisation of all its resources. Cost control is an important dimension in a performing school (Genck 1983).

Unit cost helps educational planners and administrators to compare the economic efficiency of an institution over a period of time (Gupta, 1982). This criterion was also used for the purpose of the present study and was calculated by the following formula:

$$UC = \frac{(T+A+Q+M+J)}{N}$$

Where the symbols had the following meaning

UC = Unit cost of education
T = Salary of teaching staff
A = Salary of non-teaching staff
Q = Equipment cost
M = Miscellaneous expenditure
J = Expenditure on co-curricular activities
N = Total number of students.

5. Performance in Sports and Co-curricular Activities

Performing schools are most probably those which use the teacher and the learner time to a maximum in curricular as well as co-curricular activities Schools which are well planned in their activities and have an internal management systems are likely to prove superior to others in their performance.

Number of prizes and awards won by the students of the school who participated at the zonal level in sports and co-curricular activities was used as another criterion for labelling performing schools Data was collected on these items from school records.

6. "District" Education Officer's Assessment of the School

"Case Nomination" also known as appraisal technique or grading of schools has been used as a useful criterion for gauging the performance of an institution Grading of schools may not be a rigorous data gathering device but for many practical problems it proves to be an important technique for gathering evidence. Education Officers of the Directorate of Education who is the supervising officer for schools on behalf of the Government, and is responsible for writing "inspection reports" on schools in their zones are expected to be conversant with the performance of the school. Their information was considered as an important cue for the purpose at hand

"District" Education Officer's Assessment of the school was obtained by interviewing (unstructured) the concerned district officers. Unstructured approach was adopted keeping in mind the seniority of the interviewees (district officers).

7. Parents' Satisfaction with the Institution per se

Parents expectations of the school and how far it has been met, is another criterion for the measurement of school performance As the parents are the main "stakeholders" and "partners," their needs have to be clearly understood and expressed in such a way as to help design the processes in the school. This involves developing mechanisms to ensure monitoring and feedback (West Burnham 1992) Accordingly "Parents' Satisfaction with the Institution per se" was also included as one of the criteria.

Interviews on a structured proforma (ten items on a five point scale) with the parents was used as the data collection technique. Five parents of students from each school, purposively chosen, gave their responses. Scores were obtained on usual lines.

MEASURING INTERPERSONAL SKILLS OF HEADS OF PRIMARY SECTIONS: INSTRUMENT USED

Interpersonal skills of heads of primary sections were scaled by using an adapted version for school organisation, of the already well known and standardised instrument called SPIRO (Styles Profile of Interaction Roles in Organisations) standardised for Indian Organisations by Pareek (1995). The said version for measuring the interpersonal styles of heads of schools was administered to the heads of the primay sections forming part of the sample.

The adapted version for school organisation, SPIRHOS (Styles Profile of Interaction Roles for Heads of School) had been designed to obtain a profile of managerial styles of heads of schools—low or high frequency or intensity along specific dimensions The instrument helps to know more about how heads of schools interact with the various sub-systems of the school.

As in the case of SPIRO, SPIRHOS was also based on the framework that two basic concepts can be used to describe an individual's style—the ego states and the existential or life positions (James, 1975; Avary 1980). Each of the six ego-states is important. However, the functional or dysfunctional roles of these ego-states depend on the two general existential or life positions a perosn takes, resulting in twelve interpersonal styles These twelve styles, alongwith scoring columns, are schematically shown in Table 1.

Scoring Procedure—SIRHOS A self administered instrument, SPIRHOS contained thirty-six items. "Five" instruments (for answering in relation to different categories) were used, with very slight modifications every time, one each for the five most important "interpersonal relations loaded" categories which make a school (Teachers, Students, Non-academics, Parents and Management).

E 1

Twelve Interpersonal Styles of Heads of Schools Based on Six Ego States and Two Life Positions

S No	*Style*	*Ego States and Two Life Positions*	*Items (in the instrument)*	*Total*	*OEQ*
1	Supportive	OK Nurturing Parent	1, 13, 25		
2	Rescuing	NOT-OK Nurturing Parent	8, 20, 32		
3	Normative	OK Normative Parent	3, 15, 27		
4	Prescriptive	NOT-OK Normative Parent	10, 22, 34		
5	Problem-solving	OK Adult	5, 17, 29		
6	Task Obsessive	NOT-OK Adult	12, 24, 36		
7	Innovative	OK Create Child	11, 23, 35		
8	Bohemian	NOT-OK Creative Child	6, 18, 30		
9	Confronting	OK Reactive Child	9, 21, 33		
10	Aggressive	NOT-OK Reactive Child	4, 16, 28		
11	Resilient	OK Adaptive Child	7, 19, 31		
12	Sulking	NO-OK Adaptive Child	2, 14, 16		

The total of thirty-six items was made of three each, over two life positions, for two parent (nurturing and regulating), one adult and three child ego states (creative, reactive and adaptive). The heads of the primary sections were to indicate on a five point scale how accurately each item described their feeling or behaviour. The scoring, based on a few technical steps, in which there were no right or wrong answers, was done as per standardised procedure (Pareek, 1995)

One can derive the Dominant Style (characteristic style of a person), the Backup Style (operative under emergency situations, pressure or stress and is as important as dominant style) and the Style Profile (Dominant, Backup) of a respondent by following prescribed procedures. More importantly, one can find a score on Operating Effectiveness Quotient (OEQ). As OEQ formed the main variable of the study, its scoring procedure is described a little more in detail in the following paragraphs.

Ratings given by the respondents on relevant items of a particular style (e.g, items 1, 13, 25 for Supportive Style) give a raw score on that style The twelve raw scores, one on each of the style are formed into pairs of scores on six style pairs (e.g., Supportive-Rescuing style pair for the ego state of Nurturing Parent as illustrated in Table 1 above). These paired scores are further processed through the standardised procedures, to yield an OEQ score in percentage form.

The OEQ end score ultimately indicates the functional or dysfunctional use of style-pairs constituting a respondent's use of his/her interpersonsl skills For examples, an OEQ of 56 (per cent) on "Supportive/Rescuing" style-pair indicates the percentage of the potential of the concerned style-pair as an interpersonal skill More this figure towards

100, better (or functional) the use of the functional style in the pair (Supportive). More the figure towards 0, worse (or dysfunctional) the use of the dysfunctional style (Rescuing). If found on the lower side, a person can increase one's OEQ score for going towards the ideal 100 on various style-pairs through training, etc., to make his interpersonal skills functional from the present dysfunctional.

Sample

The study was conducted on a sample of twenty schools in Delhi in 1996. Three types of school which formed the purposive sample were (i) Seven government schools (ii) Four government-aided schools and (iii) Nine private schools. All schools were selected from south-west District of National Capital Territory of Delhi because of "easy" accessibility of the investigator in data collection

STATISTICAL TREATMENT OF DATA

Criteria used to Identify Performing Schools

Basic scores were obtained on the seven criteria explained in an earlier section. The schools which scored consistenly higher on the seven criteria were taken as *performing schools.* On the other hand the schools which consistently scored lower on the seven criteria or on some of the seven criteria were taken as *non-performing schools* In the purposive sample of the study consisting of twenty schools, efforts was made to "judge" schools lying on the borderline (while interpreting the criteria scores for those schools), to fall in either of the two equal sized sub-groups of ten each for performing and non-performing schools This was done for the sake of introducing simplicity in comparing results in a preliminary study of this kind.

Mann-Whitney Test

Mann-Whitney test was applied to test the significance of difference between the interpersonal styles used by the heads of primary sections of performing and non-performing secondary schools. This statistical test of significance was preferred on a number of grounds. First, it is one of the most powerful non-parametric statistical tests, since it utilises most of the quantitative information that is inherent in the data. Secondly, it is very much suited to test the significance of difference between two groups (say, "performing" and "non-performing"), especially when the sample size is small

RESULTS

Results obtained through the statistical treatment of data on the lines explained above, to test the hypothesis that interpersonal skills of heads of primary sections of performing secondary schools will be different from those of heads of primary sections of the non-performing secondary schools, were of four kinds These were as follows

1. Raw scores on the criteria with the aim of identifying performing/non-performing schools from the sample.
2. Scores on "five" OEQs, one each for the five most important "categories" which make a school (*Teachers, Students, Non-Academics, Parents and Management*) with the aim of deriving a single *Average OEQ Score* on six style-pairs, for primary school heads of identified performing (10) and non-performing (10) schools
3. *Overall Average OEQ Score,* by averaging the five OEQ scores on six style-pairs, for primary school heads of identified performing (10) and non-performing (10) schools
4. Statistical test of significance using *Mann-Whitney Test,* with the aim of testing the difference between (i) Overall Average OEQ Score of the heads of primary sections of *performing* secondary schools, and (ii) Overall Average OEQ Score of the heads of primary sections of *non-performing* secondary schools

Results on Item 1 listed above are given in Appendix 1 These results enabled the investigator to identify 10 performing and 10-non-performing schools in the sample of 20 Results on Items 2, 3 and 4 listed above, are given in Table 2 and Table 3

FINDINGS

The results in Table 3 indicate, in general, that there is a difference in all the interpersonal style-pairs, except the last one (Resilient/Sulking), used by the heads of primary sections of performing and non-performing secondary schools of south-west district of Delhi. Details on findings on particular style-pairs go thus.

Supportive/Rescuing Style-Pair

There is a significant difference in the use of Supportive/Rescuing style-pair by the heads of primary sections of performing and non-performing schools This means that the supportive headship encourages the staff and students to develop and provide necessary conditions for continuous improvement

TABLE 2

OEQ Scores of Primary Heads of Performing and Non-performing Schools
(Teachers, Students, Non-Academics, Parents and Management)

Style Pairs	*Average OEQ Scores** *Primary Heads of Performing (10) and Non-performing (10) Schools*									
	Teachers		*Students*		*Non-Acad.*		*Parents*		*Management*	
	Perf	*Non-Perf*	*Perf*	*Non-Perf*	*Perf*	*Non-Perf*	*Perf*	*Non-Perf*	*Perf*	*Non-Perf*
Nurturing Parent Supportive/Rescuing	51.2	40.0	53.8	41.6	51.6	50.6	50.6	53.6	54.0	58.4
Regulating Parent Normative/ Prescriptive	51.0	44.0	44.2	38.8	44.4	46.4	50.2	45.6	60.0	44.8
Adult Problem Solving/ Task Obsessive	59.0	41.8	58.0	42.8	58.2	52.2	56.0	39.0	61.6	43.0
Creative Child Innovative/ Bohemian	62.2	57.6	62.6	56.0	64.6	67.6	56.8	64.4	58.0	73.2
Reactive Child Confronting/ Aggressive	65.8	57.6	69.6	47.5	58.8	53.6	64.0	55.2	65.0	50.6
Adaptive Child Resilient/ Sulking	62.0	62.6	66.4	66.0	56.2	58.2	62.0	64.6	67.6	56.2

Although Mann-Whitney test of significance could also be applied to each of the cell entries in the table to reinforce or otherwise, the findings on the main variable reported later, yet it was not included as part of the scope of the present paper.

and professional growth. In other words, the supportive head is pro-active on items, "I help my subordinates to become aware of some of their own strengths."

Elaborating, it seems reasonable to assume that the supportive headship is indirectly involved about what goes on in the classroom and about progress of individual pupils. They seem to be confident about their teaching staff and do not intervene constantly. However, they are not afraid to assert their leadership where necessary.

On the other hand it seems that the headship of non-performing primary schools do not seem to help the staff to become independent and to act by themselves. Here the headship sees the staff and students as being incapable of taking care of themselves and perceives his/her role as that of providing dependency (*Rescuing style*), to them They scored

TABLE 3
Interpersonal Style Pairs Used by Primary Heads of Performing and Non-Performing Schools

Style Pairs	*Overall Average OEQ Scores*		*Significance of Difference*
	Performing	*Non-Performing*	
Nurturing Parent Supportive/Rescuing	56 20	49 40	*
Regulating Parent Normative/Prescriptive	50 20	43 90	*
Adult Problem Solving/Task Obsessive	58 56	45 50	*
Creative Child Innovative/Bohemian	60 85	52 80	*
Reactive Child Confronting/Aggressive	64 78	51 10	**
Adaptive Child Resilient/Sulking	62 85	61 76	Non Significant

Difference of 6 between the two overall OEQ scores is considered as significant under Mann-Whitney Test

high on items, "I instruct my subordinates in detail about work problems and their solutions."

The implications of these findings could be that heads of primary sections of non-performing secondary schools, while using their interpersonal skills, need to pay more attention to the personal awareness and personal growth of the staff and the students. Stated differently, they need to "teach them fishing" rather than "give them a fish everyday" for subsistence (Covey 1991) In this light, they need to be aware of the problems faced by the teachers and the students and show empathy and guide them accordingly. In other words their growth oriented sensitivity to the emotional needs and apprehensions of their followers in the school could lead to better performance there. There is research support from other quarters also to the idea that a supportive network to the staff by the headship is crucial when work is emotionally demanding (Kasinath 1996, Pines 1982).

The findings on the use of style-pair Supportive/Rescuing by primary heads of south-west district of Delhi also gets corroborated in a number of ways First, it gets confirmed from the "reputation" such institutions have in the "market" Secondly, the investigator got a clear feeling of such a phenomenon at work during her visits to these schools during data collection phase Further, it was also observed that in the private managed schools the management itself seemed to come to the rescue of the headship and solved the internal problems of the school, instead of providing supportive role to the institutional leader, thus reinforcing the use of the Rescuing style on the part of the primary head

Normative/Prescriptive Style-Pair

There is a significant difference in the use of Normative/Prescriptive style-pair by the heads of primary sections of performing and non-performing schools This may mean that the headships of performing schools not only develop proper norms of behaviour for their staff and students but also encourage them to develop their own norms by influencing them through their own modeling behaviour. In short, the headships seem to act as exemplars and work "smart" for the school by "not prescribing." They do not abdicate their role of a leader by not giving general guidelines. They do provide the situations and the guidelines for effective performance and leave the rest to their followers (Theory Y!) for achieving goals of the organisation Normative style primary heads scored high on items such as, "I help my subordinates to examine the appropriateness of proposed actions."

On the other hand the headships of non-performing schools follow *Prescriptive style* in which case they seem to be more critical of the behaviour of the staff and students and impose rules and regulations on them (Theory X!) Too many rules and regulations by these headships may lead to burnout and less participation of the teachers concerned In their use of interpersonal skills, there is lack of trust in providing "high give and take and giving support" to the staff (Barnes 1981; Day, Whitaker & Johnston 1990). If they expect performance in their institutions, perhaps they need to motivate teachers and others in their schools rather differently. These headships scored high on items, "I clearly prescribe standards of behaviour to be followed in my work unit."

Too much of liking for prescription may not be a congenial interpersonal skill "in a fast changing world " It stands for "rigid" styles of behaviour. It does not provide scope for facing situations, when the headship is not around. And, it is physically impossible for heads to be "always around," particularly in schools which have large number of students and staff; the school strength of most of the non-performing schools of the south-west district in Delhi was in the order of around 1200. Prescriptive skills bordering on rigidity in such situations can lead to non-performance.

Problem Solving/Task Obsessive Style-Pair

There is a significant difference in the use of Problem Solving/Task Obsessive style-pair by the heads of primary sections of performing and non-performing *schools* In such a case, the locus of the headship of a performing unit is on dealing with and finding out solutions to problems In this process they solicit the help of and involve the staff, the students and the parents. They involve others, rather than involve themselves for others, in solving organisational problems In the use of their interpersonal skills, analytical approach to problem-solving is important but more important for them is the synthesis of problems with persons involved in solving those problems. In an educational management scenario, such a skill probably proves very helpful because the teachers in particular and the students in general, seem to perceive the headship as a "process helper" who takes into account personal/individual factors in his/her management of people. These headships scored high on items as, "I continuously search for various resources from which needed information can be obtained in order to work out solutions to problems."

On the other hand, the findings show that the headships of non-performing schools are more concerned primarily with the task They are not concerned that much with feelings and fail to recognise them, since they do not perceive them as related to the task. The findings seem to recommend that they need to develop reflective insights into the task and the human factor, to solve various problems in educational settings which are situations requiring extra sensitivity Without extra sensitivities on the part of the head, the headship is most probably perceived by the teachers as leaders with alien values (issues of psychological climate within the school, earlier used as criterion for identifying performing and non-performing schools). If that assumption is correct then it is definitely detrimental to performance. The *Task Obsessive* headship were pro-active on items like, "I collect information and data, even these are not immediately needed or used "

Relevant researches also point out that a well-rehearsed repertoire of solutions of a hard task master does not seem to be the answer to the solution of the problems (Leithwood et al. 1992). In the spirit of the right kind of interpersonal skills, the hard task master also needs to develop the ability to select the "right" information to solve the problem. That is, the "master" needs to appreciate that there are kinds of information and, in a sensitive organisational situation some information needs to be ignored in that situation even if it is "pure" (Leithwood & Stager 1986)

Innovative/Bohemian Style-Pair

There is a significant difference in the use of Innovative/Bohemian style-pair by the heads of primary sections of performing and non-performing schools The findings on this style try to convey that the primary headships of a performing school have enthusiasm about new ideas and new approaches. They pay enough attention to nurturing an idea so that it results in concrete action and becomes internalised in the system. In this process, they also take the management, parents, staff and students along with them, with the effective use of their interpersonal skills The implications of the findings are also corroborated with the findings of other researches which show that dealing positively with reactions and getting teachers to accept new ideas and work as a team, through the use of appropriate interpersonal skills, were assets of a performing head (Dunning 1996) Researches in the West (Miles, Saxl & Lieberman 1988) also reveal that one of the skills needed by educational change agents is interpersonal skill. A skillful handling of innovations by the innovative headships facilitated reallocating staff responsibilities in accordance with the implementation of the new ideas resulting in better coordination within the institution. Innovative heads scored high on items, "I enjoy trying out new ways and see a problem as a challenge."

The heads of non-performing schools rather seem to have "lots of ideas" only and are impatient with current practices They are less concerned with how the new ideas work, than the ideas themselves Such headships enjoy experimenting with new approaches, but primarily for fun They like change for change's sake and not necessarily the one which leads to performance. It seems that the Bohemian style practiced by the primary headships of non-performing schools, burden the teachers with unnecessary work and frame such policies which do not facilitate teachers' accomplishment; such ineffective skills most probably generate serious coordination problems at the implementation stage. Bohemian heads were pro-active on items, "I overwhelm my subordinates with new ideas."

Confronting/Aggressive Style-Pair

There is a highly significant difference in the use of Confronting/Aggressive style-pair by the heads of primary sections of performing and non-performing schools. This means that the primary heads of a performing school are confronting problems and people, on a day-to-day basis, more than those in the non-performing category, to solve matters relating to organisational performance. In other words, they are pro-active in confronting internal and external demands (Coulson 1986) They use their interpersonal skills in such a manner so as to confront members of the organisation in order to help them to openly explore various dimensions of the problem. Perseverance and not aggression, perhaps was their main characteristic They are more concerned with problems and their solutions rather than with "winning the arguments" during confrontation. Such headships are frank and open but are equally perceptive and sensitive. They respect the feelings of staff and the students These headships scored high on items, "I zealously argue my point of view in organisational meetings."

On the other hand the primary headship of a non-performing school is likely to make an issue of the problem concerned The aggressive headships seem to fight with their staff or with their management, rather than with their ideas and suggestions, with the hope that this may help them to achieve their desired results. Their aggressiveness seems to make the staff as well as others, avoid them resulting ultimately in poor organisational performance. They scored high on items, "I express resentment to the authority concerned about things that have not been done as promised "

For becoming a performer from a non-performer, aggressive heads need to develop greater critical awareness of the different types of problems. They can improve their abilities as problem solver by pursuing a systemic response to the problem concerned.

Before concluding the interpretations of the findings on use of Confronting/Aggressive style-pair, it seems necessary to offer comments on the statistical finding of a *highly* significant difference in the case of primary heads of performing and non-performing schools As it would have been noticed from the statistical results tabulated in Table 3, the statistical difference in question was found significant in the case of use of first four style-pairs, whereas it was found highly significant in the use style-pair under discussion The investigator offers the following comments for these highly significant findings in respect of primary heads of schools in the south-west district of Delhi

- A simple observation of the style of working of primary heads of performing schools shows that they were more realistic in their style of school management than their counterparts For example, they repeatedly seemed to convey and reinforce the point that it is of no use to be aggressive in a democratic setup, if one needs to achieve higher goals of an organisation One has to listen to everyone's point of view, if not time consuming, before taking their own decisions.
- On an average, the primary heads of performing schools were found younger in age, and hence seemed to perceive a longer personal future at stake, than the others
- Preliminary discussions with the primary heads of performing schools, again and again, showed signs of higher levels of personal aspirations as well as a spirit of self-actualisation, as compared to primary heads of non-performing schools.
- The primary heads of performing schools were also noticed to be the firsts to confront change Their counterparts were found going slow in that direction

Perhaps these and other similar reasons in respect of primary heads of schools in the south-west district of Delhi resulted in such glaring differences in the use of the style-pair in question, as part of their interpersonal skills. However, more data on a larger sample may be required to make very confident statements on the issue.

Resilient/Sulking Style-Pair

There is no significant difference in the use of Resilient/Sulking style-pair by the heads of primary sections of performing and non-performing schools This means primary heads of both performing and non-performing schools are similar in using the style-pair of Resilient/Sulking. A further look into the quantitative figures show that both tilt towards Resilient rather than Sulking.

When one looks into the conceptual framework on the formation of various style-pairs, given in Table 1, one finds that Resilience as a style, in Transactional Analysis terms, stands for the "adaptive child." The results then could seem to convey that one can not achieve performance by merely becoming "adaptive" as long as one is a "child." After all, a child is a child. In such a case adaptive behaviour may also lead to "buckling down" behaviour, if not counteracted with other skills Both primary heads were found as "adaptive child" most probably because of the fact that they were educationists, who in some terms are no less than such "child." However, for performance, the route "to grow," seems to be different for those of the non-performers when we look at all the findings of the study on six style-pairs in a holistic manner. Thus, in the language of the study and all its findings, it seems that Delhi's primary heads of both performing and non-performing schools tread the following route (in TA terms, which form the very basis of SPIRO), in the use of their interpersonal skill.

Primary Heads of Performing Schools	*Primary Heads of Non-performing Schools*
OK Adaptive Child (Resilient)	OK Adaptive Child (Resilient)
OK Reactive Child (Confronting)	NOT-OK Reactive Child (Aggressive)
OK Creative Child (Innovative)	NOT-OK Creative Child (Bohemian)
OK Adult (Problem Solving)	NOT-OK Adult (Task Obsessive)
OK Regulating Parent (Normative)	NOT-OK Regulating Parent (Prescriptive)
OK Nurturing Parent (Supportive)	NOT-OK Nurturing Parent (Rescuing)

One other interpretation on the findings under Resilient/Sulking style-pair could also be offered, particularly when it is in non-TA terms Very recent management literature on interpersonal insights, differentiates between an "adaptive learner" and a "generative learner" (Senge 1990, London 1995)

In terms of this differentiation, "adaptive learners" are willing to make incremental changes to enhance existing operations and activities which work fine as long as things are relatively stable When they are not, adaptive learning can be dysfunctional if it perpetuates behaviours that no longer work On the other hand "generative learners" who know how to learn, undergo transformational changes—major shifts in behaviour that emerge after self-study and situational assessment Generative learning of leaders in an organisation helps organisations to make sharp, transformational changes. When one looks at the findings in question from this angle, one can also interpret the results that Delhi's primary school heads of performing school are adaptive learners as well as generative learners. On the other hand Delhi's primary school heads of non-performing schools are adaptive learners only. More research is recommended to test these up and coming ideas

Summing up from all the findings of the study on six style-pairs or twelve interpersonal styles, the indications seem to be that interpersonal skills used by heads of schools have an important place in the scheme of things related to performance or non-performance This importance gets its prominence through the following summary on results and their interpretations·

1 'Delhi's primary heads of performing schools in the use of their interpersonal skills provide a congenial environment that minimises constraints on learning, and encourages the staff and students to develop and provide necessary conditions for continuous improvement and professional growth. Such heads of non-performing schools do not seem to act so
2 Delhi's primary heads of performing schools in the use of their interpersonal skills help the staff to examine appropriateness of their own proposed actions. Such heads of non-performing schools do not seem to act so.
3. Analytical approach to problem-solving may be important but more important for Delhi's primary heads of performing schools is the synthesis of problems with persons involved in solving those problems
4. Performance in the context needs paying enough attention to nurturing an idea so that it results in concrete action and becomes internalised in the system

5 Delhi's primary heads of performing schools in the use of their interpersonal skills, confront problems and people, on a day-to-day basis, more than those in the non-performing category, to solve matters relating to organisational performance.
6 Delhi's primary school heads of performing schools are adaptive learners as well as generative learners On the other hand heads of non-performing schools are adaptive learners only

CONCLUDING REMARKS

The findings confirm the framework that the consequence of the style-pairs used by the heads of the primary schools has an effect on the performance of the organisation Indications from most of the heads of primary schools was that interpersonal skills might help them build problem analysis, and recognition or solving strategies into their management practice. A conscious and well coordinated effort by the effective use of interpersonal skills of the headships in the interaction with the sub-systems of the organisation may maximise positive and minimise negative work features, so that work environment may produce optimum utilisation of men and material resources, rather than prevent it.

The headship need to manage highly decentralised sub-system of the school organisations. These skills require being able to establish a vision for the school vis-a-vis the community, enlist the support of the sub-systems of the school and empower others to act in ways that help achieve the vision and objectives of the school. The interpersonal skills of the school headships are a means to school performance, influence the teacher's performance and classroom processes. Classroom improvement, teacher development, and school improvement must be systematically linked if substantial progress is to be achieved (Fullan, Bennett & Rolheister-Bennett 1990) and interpersonal relations seems to be the key to the dimensions of learning

Finally, it can be acknowledged that the study, is only an indication and not necessarily representative of the interpersonal skills of the primary school headships of all kinds. The research does, however, throw new light on an increasingly important subject and offers further research leads on heads of primary school coming to terms with increasingly difficult role demands in a period of rapid educational change. Additional insight into interpersonal skills as an essential process in school performance would broaden practitioners as well as policy-makers perspectives.

Appendix I

Raw Scores on the Seven Criteria with the Aim of Identifying Performing/Non-performing Schools from the Sample

Serial Number	*Std XII Acad Results*	*Students Satisfaction*	*School Climate*	*Unit Cost*	*Sports*	*DEO Assessment*	*Parents Satisfaction*	*Performing/ Non-performing*
1	75	70	75	500	2	3	16	P
2	80	80	70	620	2	3	18	P
3	70	80	80	500	2	2	17	P
4	60	75	70	625	1	3	17	P
5	50	60	50	200	3	2	10	P
6	55	60	40	275	2	1	10	N
7	60	50	50	300	1	1	9	N
8	58	45	55	210	2	2	7	N
9	70	70	55	250	1	1	15	P
10	60	65	50	400	1	1	15	P
11	50	50	55	250	2	2	10	N
12	65	70	50	220	2	3	10	P
13	50	55	30	400	1	2	10	N
14	45	60	40	250	1	2	8	N
15	70	70	65	300	3	3	15	P
16	60	70	80	350	3	3	10	P
17	50	50	40	220	2	2	10	N
18	50	45	40	450	1	2	13	N
19	65	70	60	310	2	2	15	P
20	55	50	40	200	2	2	10	N

Appendix II
Operating Effectiveness Quotient

NOT OK Scores	*OK Scores*												
	3	4	5	6	7	8	9	10	11	12	13	14	15
3	0	100	100	100	100	100	100	100	100	100	100	100	100
4	0	50	67	75	80	83	85	87	89	90	91	92	92
5	0	33	50	60	67	71	75	78	80	82	83	85	86
6	0	25	40	50	57	62	67	70	73	75	77	78	80
7	0	20	33	43	50	55	60	64	67	69	71	73	75
8	0	17	28	37	44	50	54	58	61	64	67	69	70
9	0	14	25	33	40	45	50	54	57	60	62	65	67
10	0	12	22	30	36	42	46	50	53	56	59	61	63
11	0	11	20	27	33	38	43	47	50	53	55	58	60
12	0	10	18	25	31	36	40	44	47	50	53	55	57
13	0	9	17	23	28	33	37	41	44	47	50	52	54
14	0	8	15	21	27	31	35	39	42	45	48	50	52
15	0	8	14	20	25	29	33	37	40	43	45	48	50

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Essentials for Preschool Stage

J. Naga Laxmi

The study takes into consideration the effects of group formations, teacher-pupil ratios, space available, play material provided, teacher-pupil-interactions or friendship patterns, bahaviour of children and choice of activities by children

The investigation was conducted in twin cities of Hyderabad and Secunderabad in Andhra Pradesh. The focus of the study was on immediate changes that occur in children's experience and behaviour when placed in changing environments Observation schedule was used for systematic observations over one/two consecutive terms with reference to identified aspects.

The outcome of the study suggests that for developing desirable behaviour amongst preschoolers, minimum area per child should be worked out; enough space should be provided to enable organisation of free play activities. If such a provision is not possible, then vertical physical activity apparatus may be provided Provision of more play material is likely to lead to less aggressive behaviour. Staff involvement encourages children to develop desirable habits of social behaviour

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Doing research on preschool organisations and facilities has posed many difficulties in designing a feasible and satisfactory methodology, criteria for evaluation and interpretation of results. As was emphasised by "Brownfenbrenner" (1974), the research about preschool organisations should be ecologically valued, i.e., research should be carried out in settings or situations which are familiar to the child and which elicit a normal range of responses, that are natural

The different objectives of the present study for knowing the existing behaviour of the preschool children in their natural school settings were delineated.

OBJECTIVES

The following objectives have been formulated for conducting the study

1. To study the effects of group size (the number of children in the group) on friendship patterns, activities and behaviours of children.
2. To study the effects of the amount of space and the amount of play equipment over the friendship patterns, activities and behaviours of children.
3. To study the effects of changing staff : child ratios, over the communication between staff and children.

HYPOTHESES

In order to know about the past research works in the area, a brief review of the related literature was done and to conduct the study systematically, the different feasible hypotheses were formulated.

1. For perfect interaction and formation of a cohesive group, an appropriate number of children that could be treated as "ideal" do exist, which if changed will result in lesser group effectiveness.

2. Too short or too large a space and similarly small number and large number of play equipment are detrimental for a total and complete interaction among the preschool children. There exists some specifiable area of space and some number of play equipment that could be identified as ideal for maximum benefit to the children

3 Physical resources in terms of space and amount of play equipment that could be considered as ideal, are possible to be established systematically as minimum requirements for the preschools of India.

4. An ideal staff : child ratio for perfect communication with total individual attention could be obtained for Indian conditions.

For testing the validity of the hypotheses for realising the formulated objectives of the present study, a strenuous observational technique was adopted.

Sample Details

In Andhra Pradesh (for that matter in the entire nation) the preschool institution is given different names. In major urban areas, i.e., under the Municipal Corporations and Urban Development Authorities, this institution is noted as "Balwadis" in all the welfare programmes for children of 3 years to 6 years. In rural areas this welfare programme is being extended to the mothers also and is referred as "Angan Wadis." The educative programmes here are for the children of the age group 3 to 6 years again. However, some of the voluntary organisations who are interested in these kinds of child welfare activities preferred to be called "Shishu Vihara Kendras," mainly for the children of working women in the industries and other relevant townships For procuring a throughly well controlled data it became inevitable to concentrate only on a limited, readily (in a permanent manner) available sample and thus the study was finally shifted and confined·only to twin cities and was conducted with the cooperation of some of the teachers (who happened to be the students of the present researchers) of the schools where the study was programmed. The number of children in each term has been noted and reported at relevant places of dicussions. The details of the number of children taken into consideration for the study is not constant because along with the passing of time some of them have been shifted to other schools and few others have joined All these details have been meticulously noted and reported in the relevant descriptions of variables that were studied

The Development

The main thrust in the present study is to test the general effects of environmental variations rather than to study specific hypotheses Wide ranging assessment has become necessary, the assessment is in the main on going; i.e., to study the immediate changes that get resulted in children's experience and bahaviour when placed in changing environments. Obviously a wide range of information, i e , changes in the children's social grouping, their friendly and aggressive behaviours, kinds of motor activities, choices or toys, choices of play activities and as and when possible, measures about attention span and about intellectual and linguistic performance, etc , have to be collected.

Thus observations in a systematic manner about the precise experimental manipulation with a broad range of assessment is the lone method that is possible and as such the same has been adopted

For observing the children, it is preferred to use low inference categories so that an overall picture of the effects of environmental variations from the resultant patterns of effects on a wide range of clearly defined sample and specific behaviour units could be observed For the purpose, the behaviour units which were used by various ethological investigations, have been used, which gave a highly structured behaviour catergorisation.

The major part of investigation is concerned with relative influence of number of children and resources available to them over their behaviour in the play group The variable that have been studied are:

(a) the amount of space available for the children to play,
(b) the anount of play equipment for them to play;

(c) holding the resources per child constant, the number of children attending the play group on different days being varied;

(d) the effects of play group of constant size over many days, and varying the amount of space and play equipment.
In short, by combining, (c) and (d) to study the effects of number of children, amount of resources and resource density

(e) the kind of play equipment (small manipulative toys versus large apparatus operated) and its effects over children's behaviour.

"Observations" was thought to be the most suitable approach for collecting the data about finding general effects of environmental variations and relation of the children with the environmental conditions. Thus the descriptive, inferential and evaluative variables were considered for observations and the tool was administered for collecting the data.

Considering the magnitude of the material for first area of the study the data were collected in terms of the effects of group size on friendships, activities and behaviour of children while they were engaged in free play. Even the effect of project experience in terms of their acquittance with the exposure to this kind of new experience, along with sex differences was studied and reported.

The second area, i.e., the effects of amounts of space and play equipment on friendships, activities and behaviour of children in free play was studied in detail and the inferences were drawn.

In the third area the effects by varying the staff : child ratios, were studied on communication between staff and children during structured activity conditions.

In all the discussions of the third chapter, relevant inferences were drawn at the end of the discussion.

In the following paragraphs the inferences of the study are reported with respect to three major areas of preschool behaviour. In the first area the study was concerned mainly with the effects of group size on the friendships, activities and behaviours of children while they were engaged in free-play. In the second area the effects of both the amount of space and amount of play equipment and friendship activities and behaviour of children engaged in free play, were covered. While doing so, age and sex differences and time factors both in the morning and evening, throughout the project were controlled and their effects were documented. Finally the effects of staff : child ratio and communication between staff and children were studied. This ratio was varied by changing the number of children present and the number of staff available Different aspects, including the staff ratings of different conditions were recorded.

The observations were analysed, discussed and by applying various appropriate statistics, conclusions were drawn. These described results for all the three major areas are consolidated and reported as inference in the following paragraph.

Area I

The first area was concerned with respect to the effects of group size on the friendships, activities and behaviours of children while they were engaged in free-play,

By conducting a NR type of study (i e., by keeping the "D" constant the "N" and "R" are varied "N" refers to the number of children in a group, "R" to the environmental resources, and "D" is defined as density, $D_s = N/R$, D_S (spatial density) × N/R_S where R_S denotes spatial resources, and D_P (equipment density) = N/R_P where R_P denotes equipment resources).

The study was carried out on two groups for three separate terms, thus obtaining 3 × 2 = 6 comparisons The effects of group size variations showed some common features in all the separate terms considerably with changes in structures of companion preferences during the group play. More intimacy was exhibited in small groups by the children. In the sub-groups with four or more children more fantasy and socio-dramatic play was evinced.

Children knew each other less well in larger groups. Thus smaller sub-groups with members of the same sex were formed More so, the sex pairs of children in group play were frequent. Many times they were found to be engaged in "no activity" and as and when they played there used to be more table play

Larger groups of children showed an increased use of tricycles, may be because of more space and number of tricycles made available to them. Contrasting to this in the smaller size of the groups many children used the climbing frame, sand pit and slide, may be due to the less space available. The smaller groups were more engaged in sand pit activity resulting in longer number of incidences of object exchange. Further emotional outburst like aggression, submission, etc., were also seen Wherever there was no activity or failure in the activity they observed the other children. In groups where children are numbering to ten or less, motor activity was evinced and also there was no rough-and-tumble play, may be because of less space available.

Overall, there were almost no sex differences and group size effects were almost the same with time, i.e., both in the morning and afternoon sessions. Similarly interactions, between group size and project experiences did not occur. However certain general changes in the behaviour of children over time was observed in terms of talking in between them, decreased responses to observer, etc. All this was common to both the large as well as small groups.

The staff observing the play group with respect of group size condition, preferred a medium sized group. They expressed the view that a very small group lessened their interest in the work and a large group was too noisy and became uncontrollable. The preference was for a small medium group in which 15-25 children were included. According to the staff, table play, Wendy house play in small groups and leadership, aggressive encounters, withdrawals in larger groups were most common.

Area II

By studying over two and a half consecutive terms the effects of the amount of spaces, and the amount of play equipment on friendships, activities and bahaviours of children engaged in free play were found out and the inferences were drawn as below.

By way of consolidating the observations about group one and two it was found that, in general, friendship became more numerous during the project, the older children getting engaged in group play and less in parallel play. Doll, pram, and the rocking boat were found to be the common play equipment for girls. A steady increase in social maturity and using more number of items of equipment were found common to both groups, as the experiment progressed. Every day in the morning certain settling in effects were observed for both the groups whenever they met.

With respect to the space made available, it was found that the children used the potential available, in large space with increased running, more group running, chasing and playing and more unusual uses of apparatus such as making "chair trains" and spinning the "rocking boats" around

Tricycle usage did not increase because right from the beginning it was most popular. Object manipulation by limbs such as pushing prams, pulling chairs, etc , had increased in group two.

Vigorous actitivy like climbing, sliding, etc., was seen when less space was made available, contacts with more immovable apparatus and also with children, had increased, may be incidentally and not intentionally.

However, the spatial conditions did not show much effect in overall level of social contact, choices of companions, aggressive behaviour and auto-manipulative behaviour.

The amount of equipment in terms of toys and apparatus made available produced reliable effect on the choices of play activity, formation of the groups in terms of size, the amount of motor activity that is free in nature and in the frequency of agonistic and stress indicative behaviour.

However, the levels of social contact and object manipulation still ramained unchanged. Due to the availability of more play equipment to the children, all had preferred to play individually and independently. This observation prompted to conclude that "careful planning for nurturing innate potentialities of individuals through individualised instruction is possible."

The above conclusion was found to be true, through verification by providing less play equipment. In this situation more sharing of the material was observed. In the circumstances when less equipment is available, "careful planning nurture qualities or social behaviours and can pave the way for social learning."

"Careful planning" was found to be essential in curricular matters becuase in the condition of less play equipment the likelihood of a child being in cooperative play or smiling or talking or exchanging objects with another child, did not show much increase of these abilities. This conclusion prompts to observe that the "egoistic behaviour," as supported by the theories of personal development (like Freud, Erikson, etc) until and unless are so attempted in a programme, for a change or improvement, either incidentally or intentionally, the child cannot become an acceptable social being. Thus the "curriculum" has to be viewed and planned carefully.

Area III

The effects or varying staff : child ratio on communication between staff and children were studied during consecutive terms. Varying staff : child ratio was done by changing both the number of children present and the number of staff available The observations were recorded and the following inferences were drawn:

Over 85 per cent of communications between staff and children were found to be mainly conversational and concerned with the material provided for conducting an activity Similarly about 10 per cent were about routine matters and the remaining was about prohibitive (i.e., involving direct prohibitions like "Stop making noise," "Sit down," "Don't stand up," etc.).

Major initiation of communication was from the staff but always conversations were found to be double the number for children, than staff in initiation On the whole, children communicated more with the staff than with each other. Talking or monologues were less than dialogues concurring with the view of Piagetian stage of pre-operational period, for this sample of Indian children

Older children being more competent in verbal repertoire they initiated more communications. These children were therefore rated more friendly and sociable or mature. Girls, even when have initiated communications with the staff, some how did not receive the recognition equally. This may be because, in an overall manner, boys obtained more prohibitions from the staff which has culminated as communication. Most of the interactions were pleasurable and activity centred In short, boys received more prohibitions but the overall level was low and older children who were varbally more competent, or those who were most interested in the activities had reacted mostly with than staff.

The staff communications (which are all reasonably similar) were found to be more efficient in the second term than in the first term. Children in the second term had conversed for longer durations and almost all got replies

The effects of different staff : child ratios were fairly similar for the comparison of different sizes of the group and the comparisons of different numbers of the staff.

Both in "group" or "parallel" activity, the data on focal child samples confirmed that with more children or fewer staff the number of companions of target child was appreciably greater, almost similar to the proportion of worsening of the staff . child ratio. In the activities organised by the staff almost all children were found to take part.

There were more communications between staff and children but staff were found to be talking much of the time. In particular, staff received more communications from the children in worsened conditions of staff hair: child ratio Many children did not receive a reply thus giving scope for more communications.

When there were more children, interestingly, it was found that staff tended to initiate more number of communications to them

The number of utterances over communications did not increase when staff : child ratio was worse. Specially, the utterances did not increase at all, in larger group conditions. Thus staff initiated conversations were found to be shorter when the condition of staff : child ratio was worse

When there were more children or fewer staff to talk to, only few conversations with the staff occurred, even from the child's point of view A few of the children were found to initiate communication with other children even when no reply was received. Similarly the prohibition and routine communications by staff had increased when staff : child ratios were worse.

When more or fewer children were present the sessions were less enjoyable and also less effective comparably. Further, these sessions were more exhausting which reflected the increased effort that was put into the session in order to cope with the larger number of children.

In the view of the above observations the following implications were drawn as suggestive measures for maximum benefit at preschool level.

1. In preschool institutions, for maximum social behaviour and less aggressive behaviour and for a pleasant and free moving condition for the staff, at least 25 sq. ft area per child must be provided.

2 Rough-and-tumble or chasing games, provide more free motor activity. This helps as physical exercise for children specially in urban areas who came from congested home environments. However, it appears to be noisly and may interfere with other activities, yet it is highly recommended.

3. In case the space cannot be made available, then vertical activity apparatus is recommended Climbing apparatus provides sufficient physical activity.

4. In order to encourage social or cooperative play, to some extent decreasing the amount of play equipment may help, but a clean evidence was not established. If a vigorous spontaneous play is tolerated, then the removal of small toys will help for an increase in cooperative play, in a short term.

5 If more play equipment is made available per child, there will be less aggressive behaviour and stress condition.

6 The removal of small toys will encourage the imaginative and unusual uses of the large apparatus. In case if large apparatus is removed, it may encourage some children to engage in manipulative play object and table-based activities.

7. Table play gets encouraged in larger classes, whereas fantasy play can be encouraged in small classes The importance of fantasy has been emphasised as a prerequisite for creativity and as such during the stage of "intuition and pre-operation," fantasy play need to be planned carefully and executed.

8. Staff or the organiser of preschool sitution can control the factors such as space, size, play equipment, etc., only limitedly Variation of class, size, space and variety of equipment may best be left to their choice without any rigid recommendations for essential implementation. Flexibility is necessary especially at preschool stages.

It must be remembered that influencing one type of behaviour-change will also produce changes in other behaviours such as, reducing aggression by providing more number of toys may also reduce physical activity and also the size of sub-group. Hence, thorough planning on the part of the staff or organiser is recommended.

9. The study revealed the manner and extent to which staff should actively involve themselves in encouraging or structuring or allowing the activities of children. The main effects that may be created in the classroom are to.

(a) increase staff-child interaction;
(b) decrease child-child interaction.

The main benefits are in terms of cognitive and linguistic stimulation. This happens because of the adult (teacher) conversation, improving the language skills in children. Similarly the Piagetian concepts like, size, shape, position, etc., and by providing and eliciting from the child "thoughts and statements" about the immediate focus of activity and the remaining larger world, the cognitive skills could be improved.

10 The staff involvement creates and encourages in children the qualities of pursuence and persistence of activity, which fills the major aspects of further education aiming at "realisation of self-actualisation."

11. Another aspect is to encourage certain activities and discourage the other by manipulating the equipment and space available. This is needed as in the case of encouraging the table play (cooperative friendhip, sharing, etc) and discouraging rough-and-tumble play (for avoiding injuries, aggression, hatred, etc.). In lieu of this physical activity, dancing, miming, etc., could be substituted.

12. Because of lot of evidence available resulting from the study, it is recommended that alternatively free play periods and structured activity periods be arranged in a balanced manner for maintaining necessary tutoring or similar involvement by the staff as well as to maintain an appropriate level of peer interactions.

Impact of School Readiness Programme on Primary School Children

K. Lakshmi

The study examines effectiveness of the programme in the context of development of psychomotor, language, cognitive and socio-emotional skills, facilitating increased enrolment, and fall in drop-out rates.

The methodlogy included modifications of the material to suit local needs, training of teachers of experimental group and monitoring through visits and evaluation.

The outcomes of the experiment indicated significant difference in achievement of skills in language, number and cognitive areas by children in experimental schools, attendance increase in exprimental schools, drop-out rate fall in experimental schools. The observed differences was, however, not significant.

SCHOOL READINESS PROGRAMME

This programme aims primarily at providing readiness experiences to the children so that they can learn the necessary skills of reading, writing and number work easily The programme also helps to smoothen the transition from home to the school environemnt by providing interesting and joyful experiences which attract the children and lessens the drop-out rates in the school. ECE SRC Andhra Mahila Sabha has implemented this programme in 15 schools on experimental basis to see the viability of the programme for a wider implementation:

OBJECTIVES OF THE STUDY

1. To study the effectiveness of the School Readiness Programme on the child in the context of different development areas—namely, physical/psychomotor, language, cognitive, and socio-emotional.

2. To facilitate more enrollment and reduce drop-out rates.
3. To sustain the interest of enrolled children by using developmentally congruent activities.
4. To assess the impact of the programme on the drop-out rate.

METHODLOGY

The study was conducted in four well-defined phases:

1. Modification of available mateiral to suit local needs
2. Implementation of training programme
3. Continuous observation
4. Evaluation.

Sample

Fifteen primary schools in Hyderabad were identified for the study as sample. The sample included class I teachers (1 teacher from each of the 15 schools) who underwent the training programme and class I children who were exposed to school readiness programme

All the 15 schools were Government or Government Aided Schools. Ten schools directly admitted children to class I without any preschool background, five schools with preschool facility were identified for the programme.

Training

Only 13 out of 15 schools participated in the 6 day training programme

IMPLEMENTATION OF THE PROGRAMME

Though 13 teachers of class I were trained, only 9 teachers could implement this programme in their schools. Four schools could not carry on the programme, on account of teachers not being available in schools due to out side work such as Census or some orientation programmes. Hence these four schools who did not follow the training strategies were considered as controlled schools

Monitoring

For continuous observations SRC ECE staff visited each school thrice a week. Approximate days of monitoring per school came to 32 visits.

Observations

The following changes were observed in class I children and class I teachers.

Changes Observed in Class I Children

S. No.	*Changes*	*Experimental Schools*	*Control Schools*
1.	Increased attendance	9	2
2	Increased interest in class activities	9	2
3	Developed verbal expression	9	0
4	Developed the habit of questioning	5	0
5.	Exhibited creative expression	9	0

Changes Observed in Class I Teachers

S No	*Changes*	*Experimental Schools*	*Control Schools*
1.	Finding teaching through activities more interesting	9	2
2	Preparing own teaching materials	9	2
3.	Improved teaching style and skills	9	2
4	Improved interactions with children	9	0
5	Adherence to time table	9	0

These changes in teachers indicated the effectiveness of the programme.

EVALUATION

Objectives

Evaluation was carried out to measure:

- Whether there are any gaps in intervention.
- Whether-the interventions has helped in developing the readiness skills among children.
- Whether the school readiness programme has an impact on
  (a) improvement in attendance
  (b) achievement in terms of learning abilities

To achieve the above objectives evaluation was conducted at two levels.

Tools for Mid-terms Evaluation

- Questionnaire, interviews and observation schedules prepared for the study.
- Nature of evaluation was informal

Tools for Final Evaluation

- Question paper based on achievement in terms of learning abilities required for class I.
- Checking the regular attendance register.

INTERPRETATION

Scores of Experimental and Control Schools in Mid-term Evaluation

Skills	*Experimental Schools*	*Control Schools*	*t-ratio*
Language	73.7	42.4	4 80 ($p = <.01$)
Number and Cognitive	92	69.73	7.02 ($p = <.01$)
Physical/Psychomotor	85.3	79.8	0.42

Scores of Experimental and Control Schools in Final Evaluation

Skills	*Experimental Schools*	*Control Schools*	*t-ratio*
Language	60	44 66	2 03 ($p = 1$)
Number and Cognitive	64	50.8	1.53

Finally the overall impact of the school readiness programme on the drop-out rate was analysed.

Drop-out rate (Average per cent of schools)

	Drop-out rate	
School	*1993-94*	*1995-96*
Experimental	11.31	9 6
Control	15 32	17.6

MAJOR FINDINGS

1. The children who took part in activity-based learning in experimental schools showed significant difference in skills related to language number and cognitive areas.
2. The attendance of the children in experimental schools had improved. The activity-oriented joyful learning motivated the children to attend the school regularly.
3. The difference between control and experimental schools continued upto the final examination even if the experience-based learning technique had not strictly been continued in all schools
4. As far as cognitive/number skills are concerned "t" ratio is not significant at the stage of final evaluation. This may be due to the formal technique of evaluation, which did not provide scope to express the creative and acquired competencies (skills) of the child. This emphasises the need to bring corresponding changes in evaluation techniques whenever there is a change in the teaching strategies.
5. Two experimental schools with ECE background scored well both in mid-term and final evaluation. They were continuously exposed to activity oriented approach. In these two schools evaluation techniques were based on learning abilities.
6. Rate of decline in drop-out rate may be less in the case of experimental schools, yet it is significant in terms of the trend, as we notice an increasing trend of drop-out rate in the control schools.

Progress Report of the School Readiness Programme in Andhra Pradesh 1995-96

Early Childhood Education is now being universally recognised as a crucial input for the overall development of the child, particularly for the disadvantaged sections of society. But in India, the children in the age group of 0-6 years do not receive the required stimulation at home due to acute problems of poverty and illiteracy. Parents are not able to contribute much to the child's socio-emotional or cognitive development

In the light of the above situation, the National Plan of Action for the IYC recommended that an eight week School Readiness Programme should be given to children, particularly to those who did not have any preschool education before they entered class I.

Objectives of School Readiness Programme

1. To strengthen Universaliation of Primary Education by.
   - (a) Reducing dropout rate
   - (b) Facilitaing more enrollment by making learning joyful and interesting
   - (c) Sustain the interest of enrolled children by using activity-based approach,
2. To prepare and equip the child with necessary competencies in cognitive, physical and linguistic areas needed for a school.

As per the recommendations of the National Plan of Action for the IYC the child study unit of the NCERT has developed a School Readiness Kit. The activities included in this programme help in:

- attracting the child to the schools
- developing in them an interest for reading and increasing their attention span
- acquainting them with the school environment, other children and teachers.

These activites should be introduced before formal learning begins.

SRC ECE has adapted this kit with necessary modifications keeping in view the specific needs of the children of Andhra Pradesh. This programme has been tried out in 13 schools in Hyderabad during 1994-95 and the results found were encouraging It is therefore proposed to extend this facility to as many schools as possible throughout the state seeking support from DIETs

In this connection the following action plan was prepared and implemented

TRAINING OF IDENTIFYING DIET LECTURERS OF 23 DISTRICTS IN THE STATE AS KEY RESOURCE PERSONS

Training was given by SRC to identify DIET Lecturers for 5 days.

Objectives of Training Programme

- to develop a network of resource centres at state level.
- to train the key resource persons for the implementation of school readiness programme
- to plan a design to try School Readiness Programme in selected schools on a pilot basis.

- to prepare a package for training of master trainers and field functionaries.

Outcome of this Training Programme

- Developed a package of activities for school Readiness Programme keeping in view local specific needs.
- Developed a plan of action for a school Readiness Proposal to be carried out during 1995-96 as a state model.
- It was decided to select 10 expeirmental schcools and 5 controls schools as a sample in each district to implement the School Readiness Programme

No. of districts attended the training programme—20
No. of districts which did not attend—3 [Krishna, Prakasam and Karimnagar

These districts were provided training at the field under the second phase of training by the staff of SRC

SUPPORT MATERIAL PROVIDED BY SRC ECE

A checklist covering all the areas of development was developed by SRC, ECE. The checklist helps the teacher to assess the readiness of the child for school in terms of development. The checklist has to be administered at pre, midterm and post levels, i.e., before commencement, after one month and after 8 weeks of School Readiness Programme

Development of the Mid-term Evaluation Schedules

The mid-term evaluation schedules were prepared and printed. These evaluation schedules are being supplied to each school of all the districts to be administered after completing the 8 weeks school readiness programme by the class-I teacher The purpose of conducting mid-term evaluation is to know whether the child has acquired the required skills related to different development areas.

Development of Manual—"Navodayam"

A manual "Navodayam" on School Readiness Programme has been developed to serve as guide book for the teachers during the implementaion of the Programme. This manual includes guidelines for the teachers' activities covering the folowing areas of development

- games
- songs
- stories
- activities for language development
- pre number skills
- early science experiences
- four weeks time table of SRP.

These manual have been supplied to the teachers of all the districts who are implementing the School Readiness Programme

ORIENTING CLASS I TEACHERS IN EACH DISTRICT

Each district has identified 10 experimental schools based on the following criteria.

1. Schools with high dropout rate.
2. Minimum of one tribal school, one girls school, one school with majority of S.C. Children
3. Schools with one class teacher for class-I or at least such schools where class I teacher spends half of the instructional time with the class.
4. Schools nearer to DIET for effective monitoring.

Training Content Covered

- Different areas of development including games, songs, stories, activities for language development, pre-number skills, early science experiences, etc.
- Preparation of time table.
- Training in the use of checklists for conducting pre-test, mid-test and post-test.

Participants developed material, listed different activities, demonstrated some of them and prepared the time tables.

Total No. of Dists. when Trng. Prog. was conducted	*Total No. of Schools covered*	*Total No. of Teachers trained*	*Total No. of Children involved in the project*
19	177	177	9,000 approximately

IMPLEMENTATION OF THE PROGRAMME

The School Readiness Programme has been implemented in 19 districts in their respective schools and this will be carried on for a period of 8 weeks Manuals on School Readiness Programme developed by SRC were sent to all the schools

Out of 230 schools selected, 177 have participated in the School Readiness training programme and are in the process of implementing the programme

Out of 177, schools 73 schools were from Telangana, 70 from Andhra Region and 34 from Rayalaseema Region

Pre-test

A pre-test was conducted in different schools to assess the maturation level indicators before implementing the School Readiness Programme. Pre-test schedules were supplied to all the schools who were participating.

Monitoring by DIET Faculty

Monitoring of the School Readiness Programme is in the process by the identified DIET lecturer.

Post-test

Mid-test and post-test are in the process—to be conducted after 4 and 8 weeks of implementation of School Readiness Programme

Mid-term Appraisal

The evaluation schedules have been prepared by State Resource Centre These schedules are now being sent to all the districts

Final Evaluation

Final Evaluation will be conducted in April 1996. Evaluation schedules have to be prepared by SRC staff in consultation with DIET faculty and teachers

DOCUMENTATION

Documentation on School Readiness Programme in Andhra Pradesh is scheduled for May and June 1996.

ANNEXURE I

NUMBER OF SCHOOLS IMPLEMENTING THE SCHOOL READINESS PROGRAMME IN EACH DISTRICT IN ANDHRA PRADESH

Telangana		*Andhra*		*Rayalaseema*	
Name of the district	*No of School*	*Name of the district*	*No of School*	*Name of the district*	*No. of Schools*
Mahabubnagar	9	Nellore	10	Kurnool	8
Medak	8	Guntur	10	Cuddapah	10
Ranga Reddy	10	Krishna	10	Ananthapur	6
Adilabad	9	W. Godavari	10	Chittoor	10
Warangal	9	Visakhapatnam	10		
Hyderabad	9	Vizianagaram	10		
Nalgonda	9	Srikakulam	10		
Khammam	10				

Number of School in each Region— Telangana (8) – 73 Schools 91%
Andhra (7) – 70 Schools 100%
Rayalaseema (4) – 34 Schools 85%

Total Number of Schools covered 177 Schools
Total number of Districts covered 19 dist.

Field Trialling of Activity Oriented Textbook by SRC, ECE, AMS

Traditionally a textbook sets the agenda for teaching and forms the substance of the material for testing and evaluation The desire to give pre-eminence to a central text in this way can also accord with authoritarian and rote learning dominated modes of teaching. It seems necessary to consider educational innovations and developments of teaching materials within the context of the importance of the textbook and the kind of teaching which tends to be textbook oriented.

When new teaching methodologies are introduced they can be encompassed within the textbook, ensuring that teachers take notice of new ideas and see them as central to their own teaching. The textbook, when it retains a central position in Education, can support teachers in shifting their pedagogy and make them feel more confident in adopting new methods and activities in their classroom In this way the textbook supports and develops the existing skills of the teacher without removing known and secure ways of teaching their classes. This seems to be an important consideration when it is known that teachers are grappling with very large classes in difficult conditions

THE ANDHRA PRADESH PRIMARY EDUCATION PROJECT (APPEP)

The APPEP Project funded by ODA and managed by British Council, has been working in Andhra Pradesh since 1986 and has aimed to deliver in service training to lecturers in District Institutes of Education and Training (DIETs), education officers and teachers with the intention of introducing active learning and appropriate lowcost resource into the primary sector. Pressure to develop new textbooks was exerted by teachers who found themselves unable to implement new methodologies acquired through training in APEP principles using the existing textbook The cost effectiveness in terms of learning gains of improved instructional materials was also a consideration (Verspoor 1992). The new class I Telugu textbook was designed to encapsulate the important understandings about active and experiential primary methodology which had been developed during the years of the project and to meet the directive of Government of India that all states should revise their textbooks in the light of Minimal Levels of Learning (NCERT). The textbook was developed by a team of resource persons and a group of teachers. The teachers had been identified as having creative ideas about teaching and effective classroom practices. They were trained in a joint writing workshop to write materials developed within the context of the needs of the early years literacy learner. This was the time that an early years textbook had been written with teachers, DIET staff and early years language specialists.

Pictures

In both textbook and supplementary readers the pictures were considered to be of prime importance (Graham 1990; Gregory 1993; Waston & Styles 1996).

The pictures were understood to be much more than decoration and have an essential role in supporting access to the actual text and in developing an understanding of the text Pictures were not the picture labels of words, a role they play in many textbooks for young learners· they were intended to include concepts, vocabulary and contexts which were relevant and accessible to children from urban slum areas and poor rural communities.

In these class I textbooks pictures were carefully designed to provoke discussion and questioning and to encourage the teacher to get the children to talk and to predict what they thought the text might be about. Pictures also introduced a vocabulary related to the key initial letter sound.

Each letter was introduced in a unit containing picture, text, letter and activities.

Supplementary Readers

Supplementary readers are designed to be read by the child independently eventually, but initially with the support of the teacher, an older child or a peer. They have large pictures which support the text very closely and a limited vocabulary consisting of words made up from letters they have already learned in the early units.

Teacher Guide

Teacher guide however good, tend to be peripheral to teaching, and so in this package the Teacher Guide became a Teacher textbook. By incorporating methodology and activities, intention and evaluation work directly into pages which were interleaved at the binding stage with the pages of the children's textbook It was hoped that the usage of the valuable guidance, written by the teachers and resource persons in parallel with the units of the textbook, would actually be used by the teachers This provided to be a cheap and effective way of producing teacher material, easy to use and supportive without demanding too much of the teacher.

Qualitative Case study of the Textbooks in Use

The insights of the Early Childhood Education Programme was used in the development of the textbook and were particularly important in the teachers guidance where teachers were encouraged to develop readiness for reading and writing among the children before they started actual reading and writing.

- Improved enrollment and retention in the school.
- Sustaining the interest of the children by using developmentally congruent activities.

The 8-week Readiness Programme in the beginning of the Schooling created the demand for a continuation of the programme through activities. The new textbook played the major role here putting activities ready made into the hands of the teachers through the innovatory teacher textbook.

THE CASE STUDY

In order to see the suitability and feasibility of the implementation of the material and the impact of the reading material on the language development of the child, 4 schools, 2 with 40 children and 2 with 15 children each were selected for tryout The revised textbook material, were used and the progress was systematically observed over a period of two terms Two control schools were also identified for observation.

Observations of the children, throughout the period and extensively at mid-term point, were supplemented by the pre-test and post-test which was used in the large scale field trailing

Teachers used the textbook unit-wise, and used the supplementary readers for shared reading with the children The children were also encouraged to read the stories by themselves, enjoying the pictures and discussing the story amongst themselves.

When the textbook was used as suggested in the teachers' manuals, along side extensive use of the supplementary readers, the following observations were made:

The children in the sample schools:

- Attended school more regularly
- Showed increased interest in doing the activities
  E g , Word building
- Developed the habit of questioning and reasoning
- Developed the habit of verbal expression
- Developed the habit of creative thinking
- Started practicing writing.

The teachers in the sample schools

- Showed improved interaction with the children
- Enjoyed using the textbook and teacher manual
- Found teaching with activities more interesting
- Prepared their own teaching materials
- Improved their teaching styles and skills

Children using the textbooks and readers were observed to acquire·

- Observational skills such as picture reading and picture recognition
- Expressive skills of conversation.
- Improved pronunciation through listening more attentively.

- A wider vocabulary from reading the stories as well as from the situations given in the textbook
- Enjoyment of rhymes and stories
- Easy memorisation to songs and rhymes
- The ability to differentiate between rhymes
- Prediction, thinking, imagination and reasoning skills

By the end of the year it was very interesting to note that the children were writing legibly and they were able to recollect whichever letter was asked for. Also they were reading sentences with primary syllables and they were able to understand the stories. Post-test results showed a clear gain in learning achievement for the same schools in both reading, writing, oral expression and comprehension.

A very wide range of difference was shown in the sample schools where teachers and children were learning happily and successfully together

CONCLUSION

This new partnership between early year specialists, teachers and lecturers has resulted in materials which meet the needs of young learners. The stringent field trialling and evaluation has meant that revision to the draft test is based on actual perceptions and needs of teachers and children. Teachers have shown that they are able to use teacher guidance if it is provided in an accessible form and if it accords with their understanding of new pedagogies. Children who are first time learners in poor urban and rural areas can be helped towards literacy when materials are appropriate, interesting and developmentally congruent

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Ms Ratnamala, ECE Faculty Andhra Mahila Sabha was the Principal Investigator of the study as she was involved as a resource person in developing the textbook, hence took up the study of trialling the textbook and readers as an academic exercise

Quality Management Approach to School Reforms

Jayashree Oza

In this study inputs in the areas of leadership effectiveness, human resource management, institutional planning, curriculum and instructional leadership and community interface are considered to be critical to school development

The project was undertaken in ten socio-economically marginalised schools in Delhi. The model of intervention, described as Total Quality Cycle (TQC), consisted of situational review, analysis and identification of issues, statement of desired goals, development and implementation of improvement plans, results, recurrence prevention and future plans.

Education Management Resource Programme (EMRP) is a school reform programme with a difference This is an action research based pilot project with the aim of enhancing institutional effectiveness in providing quality education, by using concepts and practices based on management principles as lead input.

RATIONALE

There is tremendous dissatisfaction regarding the existing education system in general and school education in particular. Schools are seen to be ineffective as they are unable to provide development oriented environment and activities which bring out the best potential of maximum number of students The education provided is not life skills oriented and more often students develop a strong sense of inadequacy and poor self-image. This has its roots in the daunting rigour of socio-psychological and educational practices of present day schooling.

Hitherto, all school improvement programmes have focused on improvement of teaching-learning processes alone by providing inputs for teaching and curriculum modification Such programmes have rarely focused on the institution as a whole

In our vast and dynamically diverse system of education any one model for improvement cannot be universally applicable. Therefore, micro level improvements and innovations need to be carried out with a view to developing effective generic models which then can be implemented on a larger scale, in similar situations, to make a significant difference

MICRO LEVEL STUDY

With a view to understand the micro reality within a region and evolve a generic model for school improvement, a survey was carried out in 1991 in the socio-economically disadvantaged schools of Delhi The survey findings led to further ascertaining some well known factors which lead to poor quality of education, such as lack of competency among teachers, absence of quality teacher preparation programmes and lack of resources. The study also brought forward a new dimension, viz , lack of management competencies among the authorities of schools at all levels, heads of schools have not undergone any trainings before accepting the challenge of being the "general manager" of an institution. The well meaning benefactors of schools make all the crucial decisions of the school as members of the School Management Committee (SMC) but do not have a background in educational pedagogy or general principles of management science.

There are no professional networks for educators in the field at any levels be it principals or teachers. Thus potential of learning from network and synergising through mutual quest remain unexplored.

All stakeholders in the schools are unable to participate in any meaningful way in the school processes particularly parents and staff of schools.

Another significant finding was lack of proactiveness of the system to acknowledge dynamic changes taking place in society, resulting in a highly reactive system not ready for change As a consequence of this survey, a hypothesis was developed for school improvement.

Hypothesis

To bring about qualitative changes and improvement in the system, new approaches need to be tested. Inputs in the areas of Leadership Effectiveness, Human Resource Management, Institutional Planning, Curriculum and Instructional Leadership as well as Community Interface are critical to school development and as such should be lead inputs in school reforms

To test the hypothesis, ten socio-economical marginalised schools of

Delhi were identified to be partners in the school improvement programme. These schools are privately managed Seven of these schools are Muslim managed without restrictive enrollment policies, whereas three are non-denominational schools, with children belonging to socio-economically disadvantaged groups, located in clusters close to the community.

The school leadership is willing to be active participants in the process for innovation and change. This programme is called EMRP. It commenced in 1993 and is supported by the Aga Khan Foundation.

MISSION OF THE PROGRAMME

EMRP aims to improve the quality of education in partner schools by increasing overall effectiveness of schools through planned change. It is a pilot project which uses management concepts and practice as lead input to achieve the goal of school improvement Objectives for the programme include-

- improvements in the management skills of participant schools
- improvement in the quality of education imparted in these schools
- action research and documentation with a view to determining indicators for replicability

APPROACH OF THE PROGRAMME

The foundations of the programme are based on the belief that people are the most significant resource for any institution Every individual has the desire to excel and he/she needs a supportive environment to make this dream come true. The programme implementation then acts as a facilitator to create desired environment

To do this the team applies Total Quality Management principle of continually improving the process through total participation and team work

The project activities are focused on, to bringing excellence in people through education, training and on site support The process involves people to work towards achievement of institutional goals, in a climate of mutual respect compatible with personal values Effectiveness of this approach is resulting in creating a climate which is supportive of desired changes.

Participative and interactive strategies are adopted by the programme to enrich from diversity of the participants. Effective models and methods as well as sound concepts of pedagogy, psychology and management are imparted through interactive methods Hands-on experience and creative problem solving is used to maximise the transfer and initiate self enquiry and self learning.

The model of intervention, is described in terms of the Total Quality Cycle (TQC) through its scientific steps.

(i) Situational Review.
(ii) Analysis and Identification of Issues.
(iii) Issue statement and desired state or goal.
(iv) * Improvement Plans.
 * Implementation of improvement plans.
(v) Ressults
(vi) Recurrence Prevention.
(vii) Future Plans.

SITUATIONAL REVIEW

In order to understand the micro level reality in the partner schools, a systems review was conducted. Data was gathered from all constituencies of the school community in each of the schools. This review was conducted to establish a baseline with a view to

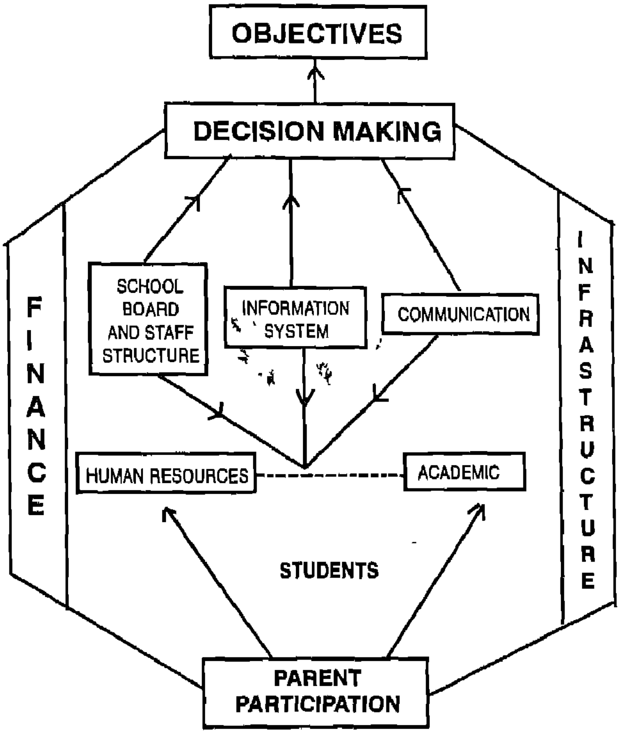
a. Assess the status of the school systems, and processes, to help identify weakness and strengths.
b. Determine common as well as specific needs of all the schools and plan strategies for improvements.
c. Create a bench-mark for measuring future progress as a result of various inputs
d. Serve as a monitoring tool assisting action research.

The exercise of collecting relevant information from SMC, principals, sample group of teachers and parents was carried out with the help of an elaborate interview schedule.

The data was plotted separately for each school on self explanatory tools with total objectivity. This created an overview of the schools which was then presented to school authorities under ten heads by way of feedback.

The pictorial depiction highlights the significance and interrelationship of each of the areas and impact of the same in entire school functioning. As is evident in the graphic depiction the most important aspect in any institutions is its vision and objectives. Every decision, strategy and action plan directly impact quality and performance of staff which in turn directly impacts the quality of teaching and other related fields

STSTEMS REVIEW FEEDBACK



School as a susbsystem of the society impacts and is impacted by the community at large. Finance and infrastructure from the two pillars facilitate smooth functioning of the school.

For purposes of objective analysis and presentation, the data was placed on various tools for each of the ten individual areas Each of the partner schools were presented feedback of its own data on self explanatory tools to create a common grounds regarding the existing situation as perceived by all concerned.

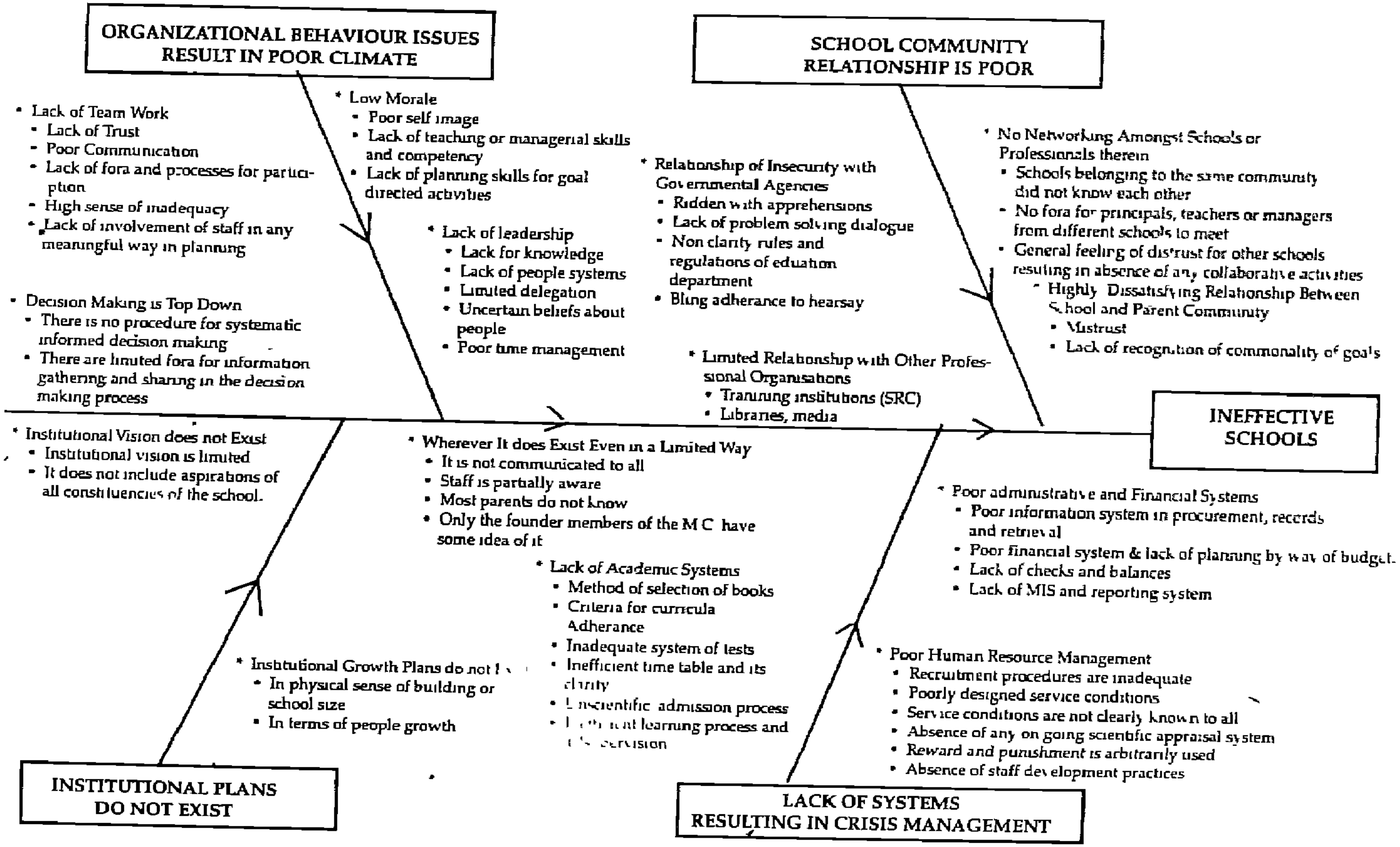
For comprehensive undetstanding of the existing situation amongst all the partner schools and the causes or the factors leading to ineffective schools, the data was plotted on an Ishikawa diagram.

Based on the causes depicted on the Ishikawa an Issue Statement was prepared to articulate details of the existing sitution and problem areas

ISSUE STATEMENTS

The partner schools are not able to provide quality education because these institutions do not have short-term or long-term goals or institu-

FACTORS LEADING TO SCHOOLS' INEFFECTIVENESS



ORGANIZATIONAL BEHAVIOUR ISSUES RESULT IN POOR CLIMATE

- Lack of Team Work
  - Lack of Trust
  - Poor Communication
  - Lack of fora and processes for participation
  - High sense of inadequacy
  - Lack of involvement of staff in any meaningful way in planning
- Decision Making is Top Down
  - There is no procedure for systematic informed decision making
  - There are limited fora for information gathering and sharing in the decision making process
- Low Morale
  - Poor self image
  - Lack of teaching or managerial skills and competency
  - Lack of planning skills for goal directed activities
- Lack of leadership
  - Lack for knowledge
  - Lack of people systems
  - Limited delegation
  - Uncertain beliefs about people
  - Poor time management

SCHOOL COMMUNITY RELATIONSHIP IS POOR

- Relationship of Insecurity with Governmental Agencies
  - Ridden with apprehensions
  - Lack of problem solving dialogue
  - Non clarity rules and regulations of eduation department
  - Bling adherance to hearsay
- Limited Relationship with Other Professional Organisations
  - Trainning institutions (SRC)
  - Libraries, media
- No Networking Amongst Schools or Professionals therein
  - Schools belonging to the same community did not know each other
  - No fora for principals, teachers or managers from different schools to meet
  - General feeling of distrust for other schools resulting in absence of any collaborative activities
    - Highly Dissatisfying Relationship Between School and Parent Community
      - Mistrust
      - Lack of recognition of commonality of goals

INEFFECTIVE SCHOOLS

INSTITUTIONAL PLANS DO NOT EXIST

- Institutional Vision does not Exist
  - Institutional vision is limited
  - It does not include aspirations of all constituencies of the school.
- Wherever It does Exist Even in a Limited Way
  - It is not communicated to all
  - Staff is partially aware
  - Most parents do not know
  - Only the founder members of the M C have some idea of it
- Institutional Growth Plans do not Exist
  - In physical sense of building or school size
  - In terms of people growth

LACK OF SYSTEMS RESULTING IN CRISIS MANAGEMENT

- Lack of Academic Systems
  - Method of selection of books
  - Criteria for curricula Adherance
  - Inadequate system of tests
  - Inefficient time table and its clarity
  - Unscientific admission process
  - Inefficient learning process and the supervision
- Poor administrative and Financial Systems
  - Poor information system in procurement, records and retrieval
  - Poor financial system & lack of planning by way of budget
  - Lack of checks and balances
  - Lack of MIS and reporting system
- Poor Human Resource Management
  - Recruitment procedures are inadequate
  - Poorly designed service conditions
  - Service conditions are not clearly known to all
  - Absence of any on going scientific appraisal system
  - Reward and punishment is arbitrarily used
  - Absence of staff development practices

tional plans To a varying degree, the staff lack attitudes and skills to create positive school climate, lack efficient systems coupled with poor community relationship

GOAL OF THE PROGRAMME: DESIRED STATE

At the end of the programme intervention, all partner shcools have a specific long-terms vision and practice of short-term goal setting, skills and attitudes at the leadership level to nurture positive institutional climate; a few of the subsystems in academic, administrative and human resource system are put in place and finally school and community relationship continually strive towards achievement of mutually identified school goals

IMPROVEMENT PLANS

As the programme team acts as facilitator, the distance between the existing situation as expressed in the issue statement and the desired state as expressed in the goal of the programme is essentially to be bridged by the school teams.

The SMCs, heads and the staff need to be empowered which would include capacity to envisage and bring changes within the school, and develop attitudes and skills required for the same

Improvement plans, which are specific to the context along with required input in need areas and schedules for the same needed to be drawn up. These were drawn up in participative process resulting in a strategic model of intervention.

Vision Building and Objective Setting Workshops

In the meanwhile, the process of envisioning the future of each of the schools and their students was being facilitated by the programme team All stake holders of the school community, i e., SMC members, parents, Heads of Schools and staff participated in this exercise leading to short-term objectives to make long-term school vision come true

Based on existing realities the short term objectives were immediate concerns of the schools and these concerns had to be responded to. Therefore the details of the interventions were essentially designed by participating school and were plotted on the strategic model And some needs get fulfilled others emerge, thus contents of the model keep changing to respond to new needs.

EMRP
MODEL OF INTERVENTIONS

ADDITIONAL DEVELOPMENT

SKILL DEVELOPMENT

SYSTEMS DEVELOPMENT

ENTRY PHASE	DIRECT INTERVENTION PHASE				SUPPORT PHASE
	INSTITUTIONAL PLANNING	ORGANISATIONAL BEHAVIOUR	SYSTEMS DEVELOPMENT	COMMUNITY INTERFACE	
● STOCK TAKING ● TRUST BUILDING ● REVIEW ● FEEDBACK	● BASELINE SURVEY ● OBJECTIVE SETTING ● ANNUAL CALENDAR ● ON GOING REVIEW& ASSESSMENT BEFORE FURTHER PLANNING	● SELFWORTH EFFECTIVENESS ● TEAM ● LEADERSHIP ● DECISION MAKING	● ACADEMIC SYSTEM ▪ Staff Empowerment ▪ Examination System ▪ Creativity Camp ▪ Instructional Leadership ● HRM SYSTEMS ▪ Substitution Software ▪ Computer Awareness for Systems Development ● MIS ▪ Action Research ▪ Administrative Staff Development ▪ Financial Systems	● PARENT PARTICIPATION ● NETWORKING WITH OTHER AGENCIES ● NETWORKING OF PROFESSIONALS	● MENTORSHIP ● COLLEGIAL SUPPORT SYSTEMS ● RESEARCH ● PUBLICATIONS ● ACCESS TO DATABASES ● ELECTRONIC NETWORKING ● FORUM FOR PROFESSIONAL GROWTH

INFORMATION SEEKING AND DOCUMENTATION

TRAINING

METHODOLOGY OF ALL INTERVENTIONS

DEVELOPMENT OF INTERNAL CHANGE AGENTS

SITE BASED SUPPORT

FOLLOW UP

FEEDBACK

RESEARCH

NETWORK DEVELOPMENT

PUBLICATIONS

AREA-WISE DETAILS OF THREE YEAR INPUT

	ATTITUDINAL DEVELOPMENT 1993	SKILL DEVELOPMENT 1994	SYSTEMS DEVELOPMENT 1995	ON GOING
INSTITUTIONAL PLANNING	—Status survey —Feedback of findings —Workshops for setting objectives and long term vision for the institution	— Goal setting and planning (2) — Work plans — School Calendar and training schedules	— External evaluation — Internal evaluation — Result based planning — Focus on three areas	CONSULTANCY SUPPORT — On issues like building layout plans space management — setting up of vocational training centre — Fund raising techniques — Seeking mentorship from empathetic successful school leaders for developing EMRP school leadership
ORGANISATIONAL BEHAVIOUR	—Principals interactive session —Talks by experts in the field of education —Management of Change —Network Meets (1)	— Leadership in schools — Leadership skills in management — Book on leadership for excellence in school management — Basic supervisory skills — Expression of learnings in form of a Play — Network Meets (2) — Forums to participate with other pubic school principals	— Leadership training — Leadership effectiveness programme — Network newsletter — Net meets (4)	— Conflict resolution, team building and decision making process in management committee meeting — Delineation of authority and responsibility principals
SYSTEMS • Academic • Human Resources Management • Administrative	—Early childhood education —Maths Training – 1 —English Training – 2 —Group Nominal Process and faculty development —Format for systematic compilation and retrieval of information	— Early childhoold education 1 — Maths training – 2 — English training – 3 — Creativity camp — Examination system review and back — Development of software to handle teacher substitution effectively — Computer awareness training — Financial management — Accounting guide for school leaders — Training for office staff	— Maths training (2) — Instructional leadership programme — Follow up Training — Instructional Leadership manual — Creativity camp — Action research — Computer awareness training — Management Information system — Total Quality management	— Implementation of workshop learnings into classroom situations — Streamlining admissions — Timetabling — Review purpose and quality of exams — Design of cumulative records — Initiation of development of question bank — Alternative opportunities for physical education activities in school without adequate space — SUPW — Recruitment and staff retention — Creation of faculty system
COMMUNITY INTERFACE PARENT PARTICIPATION	—Involvement of parents in data collection	— Parents are introduced to the changes the schools are undergoing — A few parents participate in objective setting workshops	— Workshops to sensitize teachers towards parental needs and activities — Teachers elicit from parents problems faced by them — Parents forum-early childhood issues — Workshops for teachers teaching adolescents	— Communication with parents in two languages Urdu English — Scheduled Parent teacher meetings

METHODOLOGY OF ALL INTERVENTIONS

INFORMATION SEEKING AND DOCUMENTATION

TRAINING

DEVELOPMENT OF INTERNAL CHANGE AGENTS

SITE BASED SUPPORT

FOLLOW UP

FEEDBACK

RESEARCH

NETWORK DEVELOPMENT

PUBLICATIONS

IMPLEMENTATION OF IMPROVEMENT PLANS

The approach to interventions is based on the belief that people have best information about themselves and their work Solutions to their own problems can be generated by developing certain skills and attitudes among them,

It is a new approach in creative problem solving Participative processes are used to assist those with different view points to become collaborative advocates for consensus solutions.

The consensus approach fosters a willingness to agree to a community decision which protects the individuals beliefs, values and integrity.

It is a process of shared agreement of the group in which each participant has ownership The process encourages divergent and oppositional contributions to add richness to the final decisions It is much more than a group's verbal commitment, it is a behaviour that occurs when a group acts to bring about outcomes desired by all members of the group.

INSTITUTIONAL PLANNING

The most important activity of trust building with a series of meetings with the SMCs, and principals, a practice which continued with subsequent work.

Baseline Survey

A baseline survey was carried out in each school with a view to review systems and people processes. The review concentrated on responsibility centres and systems in place which help the school to achieve its goals.

The information thus gathered was analysed and objective interpretation of the data was presented on specific tools designed to give a visual understanding of the existing situation This package was then shared with the leadership of each of the schools separately in two session. First one, to provide feedback on the total systems; second one was to mutually identify need areas to be addressed and develop future plans of action. Such a comprehensive picture led to the identification of collective as well as specific needs of the schools The conduct of the study and its objectivity established the first link of trust in EMRP's belief system amongst the school. Even the process of responding to questions was a catalyst for the interviewee to begin questioning certain practices.

Baseline survey highlighted that there was a lack of common understanding of school values and goals among stakeholders of the school community. Thus, to facilitate the school teams to develop their own goals and synergy to achieve them, two day objective setting workshops were organised for each school. Participants, i.e , entire teaching staff, representative of SMCs and parents were brought together on a common platform to study the school situation as it exists, along with historical backlog of perceptions that existing situation need to change, the whole group envisioned the school ten years hence In order to translate that vision into reality, in the first instance short-term goals for three years were set

Subsequently, there was a need to develop collective and school specific action plans All schools' objectives as well as need areas as emerged from the review were the basis for such planning. These exercises have been undertaken to develop annual plans for future direction

Periodic assessment has been built in to the design of the programme At least three times the proceedings have been relooked at and assessed using questionnaires and interview schedules

Besides these, there has been one external evaluation by experts from a British University Each of these evaluations was a planned step and the learnings derived from these became the basis for further planning to enhance what was effective and relook at what was not so effective.

Interventions provided have been supported by site based visits and consultancy with each school to help them try out learnings in their real situations Follow-ups and feedbacks have also helped in observing the impact of inputs in peoples behaviours and operational systems

Initially schools sought help on issues related to building construction planning, better utilisation of resources, how to raise funds and to empower the school leaders. Now it is being observed that more support is sought in learnings of actual tools and techniques for planning

ORGANISATIONAL BEHAVIOUR

Self Worth and Effectiveness

Findings from baseline survey suggested that the sense of inadequacy at various level was very high. Lack of certain skills of knowledge in an unsupportive environment contributed to a lot of secretiveness, unwillingness to share or look for new solutions to problems.

After various processes for defreezing and opening up it became obvious that participants had a will to learn, all that was really needed was to provide opportunties to learn. These were provided by way of trainings, workshops and practices of the same within their school in a supportive environment.

Consultancy support has been extended regularly to the participants to support in practicing new ideas These activities and all other exposures have led to increaseing self worth amongst most who have been participating regularly.

Team

Baseline survey indicated that the EMRP schools had a number of people working in each school but without a binding commitment to any goal or the organisation. Specific team building workshops have been done with the schools wherein the praticipants were made to experience the need for working together and developing synergy

Visioning activities of objectives setting workshop helped the teams to come to a common understanding and look ahead. This vision encouraged team members to see their own roles in making the dream come true

Accepting changes and implementing the same, even if it is by choice, is difficult for any team. Therefore, participants were prepared for intitial dicsomfort and knowledge that all teams undergo certain stages of team development and what these stages are characterised by to help each team manage the change appropriately.

Within each team, leadership qualities are required in all its members. The leadership role is viewed as dynamic one with its focus on accomplishing the objectives. Developing specific skills and attitude of mind have been a focus of several intervention with the leaders to provide a conducive environment for the teams to function.

Leadership

In order to address the need areas that emerged out of the analysis of baseline survey findings and interactions, a number of interactions were designed to impact leadership of the school These activities included workshops, talks by experts, on site support and materials (books, handouts, etc.) for reinforcement, spread over three years. Target group for these inputs have been principals, managers and senior teachers in order to develop critical mass of leaders in the schools who can lead the change processes.

Modern management techniques to enhance quality have been adapted to educational context and more specifically the client group. In the dynamic world the challenges of a leader of school is also undergoing dramatic changes therefore empowering the leadership to respond to the same has been the focus of these activities.

In one of the first workshops the group was invited to interact and share their anxieties and apprenhensions about working with an external agency to strengthen their own institution, an idea hitherto unknown.

Focus here was mainly to prepare ground for a useful and richer interaction as the school leaders had met each other for the first time.

In subsequent trainings and other inputs, interaction focussed on role clarity, communication, motivation, leadership styles, personal effectiveness and management of change as concepts with practical simultations.

Principals from other leading schools were also invited so that the EMRP principals could interact with them and enrich through lateral learning

In an attempt to facilitate development of secondline of leadership, training programmes were designed for supervisory staff These included themes such as Basic Skills of supervision and coaching, monitoring, effects of praise and reprimand, effective communication and conduct of meetings.

Innovative methods like dramatics have been used to stir up ideas and question the existing system The school's leadership developed, directed and enacted a play in front of the parent community, the school staff and other dignitaries.

The play brought the principals and teachers out of their stereotype roles, bringing in a fresh perspective Development of script was a witness to number of intensive debates wherein these educators questioned the trodden path and challenged issues like admission policy, fees, books, syllabi, training and development and number of other practices The whole team put their heart and soul into it to demonstrate the whole process of change very powerfully

Decision Making

Decision making was another area where there was a lot of non-clarity. Workshops were conducted to expose the decision-makers to different methods and types of decision making and learning to distinguish between policy and functional or routine decisions. The team worked intensively with the school on their decision making and delineation process of authority and responsibility of principal and manager.

SYSTEMS DEVELOPMENT

Initially the focus has been on three sub systems academic, HRM, and administration.

Academic System

The diagnosis highlighted that the schools needed

- Effective teaching processes which need a strong component of coaching, planning as well as monitoring tools,

- Effective system of evaluation which is scientific, objective and tests what is taught,
- The student-teacher time management in regard to the time spent on task, i.e., interaction for learning in reference to time table and annual calendar planning

Staff Empowerment

As mentioned earlier the objective was not simply to provide teachers with better methods of teaching but to empower and ignite that curiosity in them so that they find skills and new methods to establish effective practices on their own

In addition to the management trainings, number of trainings have been conducted for classroom teachers. A series of workshops for teachers of mathematics were organised to help teachers to develop simple and innovative ways to achieve student learning.

Total of four workshops have been organised for teachers of English, once again to help them develop methods and tools to make them effective in thier roles. Besides this important objective the workshops were designed to develop confidence in them that they too can develop teaching, testing material and do not always wait for others to take decisions for them. Workshops with similar objectives and input have been organised for nursery teachers.

In all the above programme concepts related to classroom management, behavioural aspects of children and increasing learning effectiveness, formed the underlying fabric of the training

Teachers teaching English and mathematics were selected as participant teams for the workshops as the schools are anxious to improve the teaching effectiveness of these subjects. However, the methodology and techniques imparted could be generally applied to any classroom situation and managing academic processes effectively.

These series of workshops were aimed at empowering the teacher teams to bring about changes through group processes to increase students learning. These changes could be in the methods of teaching, selection of content or testing.

Follow-up

Visits were carried out to ascertain the elements of training which are used and support the implementation in the schools where needed. These visits also became feedback to plan the future training to suit the participant needs

These visits have also helped in observing the impact of the trainings on peoples behaviour and on operational systems

Examination Systems

Examination management has been another time consuming and often not the most effective activity of the schools Evaluation is an integral part of the learning process chiefly as a feedback tool for the teacher, the taught and the whole system. Ideally this feedback must lead to improvement in teaching-learning processes resulting in student performance In the prevailing situation, the evaluation system in schools mean conducting exams and giving results to the students as an end product. The results are not viewed as indicators to affect appropriate changes.

With a view to increase the utility of the examination as a tool for systemic feedback, a study of the whole system through a detailed interview schedule was conducted and data was compiled about the whole process from all schools. The areas studied were the pattern of examinations and division of the syllabus, the allocation of marks, paper setting procedures, and its monitoring, promotion criteria, records and performance feedback including report cards

The understanding of the prevailing system indicated certain lacunae which impact the ultimate criteria of student performance, i.e , marks It was found that the subjectivity of the system, lack of evaluation techniques on the part of the teachers and inability to use evaluation as self monitoring and feedback tool was resulting in skewed performance indicators

The outcomes and the analysis of various aspects of the evaluation system were shared with the leaders of the schools Certain guidelines were suggested to help them to diagnose systems inadequacies, take remedial actions thereby leading to improved examination systems.

Creativity Camp

Within the scope of the programme, EMRP activities are limited to directly working with the staff and management of the partner schools However, it was felt that students within the schools are the ultimate beneficiary of the programme and their needs, difficulties and abilities are essential benchmark for the programme team to address the school needs This was an activity undertaken to test the often used refrain of the staff, "but these children are different" whereby referring to their socio-economic and cultural backwardness

A five-week long camp was organised in 1994 during the summer vacations The students in the camp expressed their creativity through theatre, public speaking, group discussion, art and craft and science activities.

In confirmation of our belief and to our sheer delight, the team found the students responding with abundant measure of joy and learning

In the subsequent year, i.e., 1995 an intensive six-day programme was prepared to help teachers to become autonomous camp organisers and include such camps as part of the school calendar each year.

Instructional Leadership

Essential component of leadership in schools entails effective supervision/monitoring and demonstration of instructional skills. There was a need to develop the supervisory staff so that they can act only as role models but also provide coaching to the departmental staff in improving the classroom instruction.

To address the need, an intensive residential training programme was conducted, this included essential elements of lesson design, instructional objectives, principles of learning, supervision and effective communication as a tool to coaching. The programme offered ample opportunity for practical experiences, and hands-on practice. Each school presented its plan to upgrade the instructional skills of teachers and supervisors in their respective schools.

Periodic follow-up is being done to enable the participants practice the learning in their actual school situation through mutual cooperation and support amongst themselves.

A manual "Instructional Leadership" is prepared for ready reference of the supervisory staff in their day to day work of modelling and coaching.

HRM System

Baseline Survey revealed that there was hardly any standardised or even rationalised system in place for HRM. Issues of recruitment, service condition, staff turnover and manpower planning as well as systems of staff rewards and reprimand have been undertaken with schools independently. Certain issues of common concern, i e., teacher substitution for absent teacher or specific skill developement in methods of preparation of MIS are addressed in common workshops for all schools.

Software for Substitution

Based on the needs observed and often repeated complaints of teacher substitution and everyday problem it creates the issue has been studied from various dimensions. It was recognised early in the project that teacher absenteeism is a problem not only in itself but also because of the stress it generates at the beginning of the school day when substitution has to be managed and many teachers are given extra classes over and above their own workload. The factors of equal distribution of workload, student gain from substitution teacher, the records of this additional duties were some of the issues of concern. The schools immediately required a tool which was objective and in the shortest possible time could study all the above factors and give substitution duties objectively. To respond to this need a teacher substitution software package was developed and given to schools The package would generate a substitution list, individual teachers timetables, daily school timetable, weekly and daily free period lists, a substitution record and a leave record

The timetable incharges as well as computer teachers of partner schools were trained, and are being supported, to use this and three schools are using it daily.

Computer Awareness

Based on the need specified by school principals regarding a basic orientation towards computers and its scope in streamlining the school office requirements, a workshop was organised The workshop covered the fundamentals of understanding the computers and their relevance in a school system, so that school leaders can have a deeper understanding of what kind of reports, records or ongoing system can be expected for financial and administrative regular requirements.

Management Information System

Close on the heels of the Computer Awareness Programme a workshop on "Management Information Systems" was organised for principals, faculty heads and administrative staff of EMRP schools.

The objective of the programme was to understand the purpose and characteristics of an effective information system in schools: to develop a holistic view of a school information system, to support different types of decisions at different levels, to identify one critical area of school functioning and design, step by step, an information system in relation to it so that insights into the implementation process are gained

The process helped to develop two models, i.e., academic process monitoring and personnel management. The participants gained insights into step by step planning of information system for quality decision making.

Action Research

High teacher absenteeism has been an issue which has been of grave concern to the principals and managers. Action Research is being carried out to ascertain the causes of absenteeism, leave regulations, it's impact on student-teacher contact time and plan for improvement based on the data made available.

Administrative Staff

Non-teaching staff are another set of people who are generally left out from the scope of trainings where as they are actually the interface between the school and the outside world. Therefore training programmes with focus on transactional analysis, self-esteem, role clarification, communication skills and cooperative ethos were conducted to help them to understand others' perspective and further understand their own role

Financial System

The school review indicated that most schools did not have a system of budgeting as a planning tool. Money was spent as seemed to be required by the contingencies of school activities. Most leaders also do not have a basic knowledge of book-keeping functions A workshop was organised for school managers and principals on various aspects of school budget as planning and monitoring tool. It also included knowledge of systematic checks and controls and preparation of financial statements along with very basic book keeping system.

A manual has also been prepared for ready reference for school leaders giving insights into basic financial and accounting systems and other related matters like taxation and audit procedure and requirements The manual has practical day-to-day examples, case histories and is written in simple language.

COMMUNITY INTERFACE

Parent Participation

Parent and community participation emerged as another need area from school as well as parents perspective. Baseline survey pointed out that most of the school had fora like PTM but were using them only for informing parents about child's performance and parents' responsibility to improve the same, whereas parents were ready to attack the school and its seemingly unwanted hostile bahaviour towards them Some schools had adequate information about the parental background but did not have this information in a form of a database to be utilised for the school community benefit

Parents were intially involved in the programme at the time of data gathering for school review. They were given opportunity to share concerns and feelings regarding their children's education Subsequently few parents were invited for the objective setting workshop for the schools. The schools have been urged to communicate with parents in two languages in Hindi/Urdu and English and not limited to English only. Create an environment where parents felt welcome in the school. Besides some attempts have been made at enhancing the scope of PTM.

The full blown programme of enhancing school parent participation began with a one-day workshop involving the whole school staff to understand their own role as teachers in responding to the children's needs as well as ways by which they can help the parents in supporting the children in their development.

This workshop led to development of some strategies for school to reach out to parents.

To facilitate greater participation of parents in activities of awareness creation and sensitisation to the children's needs colective fora of all schools have been created, based on the age group at three levels. First one being from Nursery to class IV, second one from V-VI and third from VIII-XII One of the first activity of the Parents Forum for the first level was a panel presentation comprising of a psychologist, a paediatrician, an educationist and a community leader followed by a valuable interaction between the panelists and parents.

Methodology of this intervention was information seeking from parents in regard to issuess, concerns and problems faced by them and documentation of the same. Sustaining the changes by developing internal change agents by way of creating core groups. This forum has set the ball rolling for ongoing communication between the teachers and the parents. Many other actitivies are envisaged to strengthen this relationship.

Networking with Other Agencies

Workshops are held at research and educational institutions so that principals and teachers get familiarised with these and a conducive climate for learning is provided Another important objective is to remove inhibitions so that they can assess these institutions for consultation or use of other facilities in future.

EMRP school principals' network has been established wherein meetings are held periodically to discuss identified issues of common concern.

This has also become a forum for sharing experiences and celebrating successes. Lateral learning continues to take place in internal EMRP network or while working with principals from other schools. A quarterly Network News Letter is also being published with contributions from the schools. It is hoped that by next year this will be entirely done by the schools and all the activities of Network will live much beyond the life of the project.

Development of Materials

As the process of implementation was going on, a need for relevant materials to support the trainings and on site consultancy was being faced

The programme team developed a number of such reference manuals and materials in the course of project implementation. Some of these are—An Accounting Manual for School Leaders, Leadership for Excellence in School Management, Instructional Leadership Manual and some brief training designs for the internal change agents to be used in the schools as ready reference.

RESULT: IMPACT OF THE PROGRAMME

Action research and documentation is one of the objectives of the programme with a view to continually learn from our practices. This opportunity to reflect on the team planning and practices are an ongoing process. The partner schools are also involved in this process and provide feedback to the team as well as critically look at their own progress and hindrances.

Over and above internal evaluation there has been an external evaluation of the programme by experts from the Sheffield University, UK. The evaluators support that there is a significant impact of the programme. The result is presented in a table with details of impact in each area.

Recurrence Prevention

Success of any important programme is evaluated on the basis of the sustainability of its impact and improvements made. Knowledge and practice of certain preventive measure which do not allow the malice to set in again is also very crucial for long-term impact.

- It is very diffcult to take out training time for professionals in the already crowded work year of schools. To build in non-instructional time for professional development of staff in the school calendar is critical and schools are beginning to schedule these.

- The changes are made by people who believe in the need of it. They are internal to the school system and therefore it is imperative to build critical mass of change agents within each school
- Continuous reflection based on actual data can prevent any kind of inefficiency from setting in
- Systems development needs to be reviewed in all its dimensions by the schools and newly established systems and people processes need to be further strengthened.
- Networks of schools' staff need to be strengthened
- Support provided by an external agency in the process of change initiated by the schools, needs to continue forv the next few years

As the programme moves into its next phase the programme team as well as partner schools will keep this learning in mind to prevent recurrence of the pre-programme state of the schools

Learnings

Ongoing reflection through the project by the team as well as partner schools taught some lessons which are valuable at macro level as well as for continuous improvement processes in micro situations to strengthen ongoing improvement plans.

- The school leaders, volunteers in SMC and more importantly principals of schools must undergo formal training in areas of management, administration and pedagogical planning.
- Management inputs are critical to all segments of the school community to increase all round effectiveness
- Within the same school system, school reform programmes can adopt a generic approach, while elements of details with regard to inputs and methods will differ to respond to the dynamically diverse entity of every school.
- In order to make a significant improvement in school a top down and bottom up approach is essential. This creates a climate for change which responds to each others' needs, i.e , leaders and staff teams
- In keeping with democratic values and psychological principles, employees with high specialisation need to be involved at various levels of decision making to maximise from their expertise to reach school goals

Future Plans

At the programme level, as observed in its impact there are strong indications of its effectiveness and utility. In the next phase focus will remain

RESULT
IMPACT INDICATORS OF EMRP

Attitudinal Development	Skills Development	System Development	
Institutional Planning	**Organisational Behaviour**	**System Development**	**Community Participation**
• Schools now have vision and short term objectives • School Management Committees (SMC's) now meet regularly • Schools record decisions taken at meetings • Leadership is now sensitive to planned staff development and implementation • Leadership has started to reflect on systems and processes	• Change in Styles of leadership of SMC's and Principals • Positive outlook of staff • Leadership is now more open, trusting, sensitive to staff • Planning, decision making has become more participatory • Greater transparency in policy making • Positive changes in behaviour and work habits of principals • Positive changes in teachers self perception, communication skills, evaluation of students	• Schools now have well laid out recruitment • Service conditions of staff are in keeping with state guidelines • Teachers now plan academic work in teachers diary • Examination system is being critically looked at and changes being implemented • Teachers now experiment with the seating arrangement • Guideline has been made for amount and type of homework. • School textbooks are bieng critically analyzed • Principals are now a part of SMC • Principals have functional autonomy • Admission policy has been laid down with set percentage for recommendations • Reporting pattern for each one is clear • Records are now maintained • Accountability pattern is emerging • Most of the time is now spent-on one 's own work • Schools are ready to change the overall system & move towards vision	• Schools are beginning to see parents as partners • Network for professional sharing at all levels is coming up. • Greater empathy towards parents • Parents and teachers are aware of holistic developmental needs of child and ther roles • Newsletter for community spirit professional sharing has been initiated • Schools take initiatives for staff development
MEASURES FOR • RECURRENCE PREVENTION • SUSTAINABILITY IMPACT			

on organisational behaviour and system improvement. Efforts to mobilise involvement of the community to strengthen the school as better learning places for students will continue whilst keeping the learnings of phase I in the forefront Systematic documentation, ongoing review of plans and practices with focus on action research will be an important thrust for maximising from the project.

On the other hand some of the learnings and practices are at the state of maturity and without any loss of time must be put to use for the benefit of the larger community. Plans are underway to utilise these learnings in their critical and crucial elements in larger systems of state governments

Non-detention Policy and Drop-out in Primary Education

Sharmishtha Chakrabarti

The study assesses the impact of no detention policy, on drop-out rate and achievement levels of children, and its relevance to effective implementation of the DPEP.

The findings indicate that the drop-out rate at class III level was higher as compared to that at classes II and I level drop-out rate was lower in the second phase (1984-88) as compared to the first phase (1974-78), percentage of drop-outs in case of girls was higher as compared to that of boys

The study suggests that mere declaration of non-detention policy is not enough to reduce stagnation and drop-out rate. It should be supplemented by efforts like orientation of teachers, diagnostic testing and remedial teaching, organisation of co-curricular activities, etc., to have the desired effects

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Universalisation of Primary Education (UPE) is the single most crucial problem in education in developing countries and to be more specific in SAARC countries. Efforts towards UPE was stepped up especially after Independence. UPE is a constitutional mandate. Universalisation of Primary Education (UPE) in India has innumerable problems with slight variation from state to state, such as lack of adequate resources, tremendous increase in population, resistence to the education of girls, large number of children of backward classes, general poverty of the people and the illiteracy and apathy of parents. Wastage, stagnation, drop-out, non-attendance and non-enrollment are the major problem areas The National Policy on Education (NPE) 1986 suggested that special attention would be paid to increase retention, improvement of quality, specification of minimum levels of learning and their attainment by the learners. A phased drive symbolically called Operation Blackboard will be undertaken with immediate effect to improve primary schools all over the country UPE is concerned with the National Policy of Education stress on retention, participation and achievement rather than more enrolment would be reinforced.

Non-detention Policy (NDP) has been introduced for reducing wastage at primary stage for achieving the stipulated target of UPE Under this policy all the enrolled students are prompted to the next higher class at primary stage The students have to achieve a desired minimum level in all the subjects. The National Policy on Education, 1986 has recommended the implementation of this policy. The document of Programme of Action (1986) has also stated that if it be needed non-detention policy should be implemented upto class VIII The Government of West Bengal in order to solve the acute problem of stagnation and drop-out has declared non-detention policy in the year 1981 at primay level of education The policy has stated "No student upto class IV can be detained at the end of the academic year Some students, however, may be detained for an extra academic year in class V on the basis of an overall evaluation depending on the necessity of compensating any drawback in the students efficiency."

REVIEW OF STUDIES

Several research and project studies were conducted on stagnation, drop-out and wastage in primary education in India From the various research findings it is evident that the causes of the stagnation, drop-out and wastage at primary stage are due to social, economic, educational political, administrative, language, etc. Masavi (1971) found that the economic backwardness to be the primary cause for wastage and stagnation on primary education of S T and other causes were illiterate parents, untrained and inefficient teachers, unsuitable curriculum, medium of instruction and non-stimulating school environment. I.S.E C (1981) found that the occupation of families of drop-outs (95.9 per cent) was agriculture. Reason for drop-out were assisting in household work, tending cattle, looking after younger siblings and working on daily wages. For girls, education was coming in the way of marriage, most of the drop-outs were engaged as paid labour A.N Sinha Institute of Social Studies (1981) found that the drop-out rate was significantly connected with the number of teachers in the school, the number of science kits available in the school and headmaster's qualification.

Saxena (1982) studied the causes of drop-out during the session. The main causes for drop-out during the session were found to be lack of sharing of the responsibility of looking after younger brothers or sisters at home and doing domestic chores, lack of interest in school life, stringent financial condition of parents and the negative attitudes of the society toward education. SCERT in the West Bengal conducted a pilot study on the causes of drop-out and wastage The study highlighted different factors responsible for the problem In this study teachers are of the opinion that financial constraints of the guardian is the main cause of dropping their children temporarily or permanently from the school. They engaged their wards for earning livelihood. While taking review it was found that there are very few studies conducted on Non-detention Policy of Primary Education. One study was conducted by Desai (1985) having examined the cause of learning disabilities among primary school children. He observed the abolition of examination-based promotion in grade I and II has seriously affected learning levels of the children.

Non-detention policy was declared in the year 1981 in West Bengal It has become imperative to evaluate the implementation of this policy and to assess whether the drop-out rate has fallen and the desired attainment level has been achieved by the learners, who have completed primary education. It is also significant and relevant to study the effective implementation of non-detention policy in primary education particularly in the context of DPEP (District Primary Education Project) currectly running in West Bengal.

OBJECTIVES

1. To find out the rate of stagnation at primary stage class I, class II and class III before and after declaration of non-detention policy
2. To determine the rate of drop-out at primary stage class II, class III, and class IV before and after declaration of non-detention policy
3. To find out the time taken by the students to complete primary education before and after declaration of non-detention policy.
4. To find out whether there is any difference between male and female students regarding the rate of drop out at primary stage of education
5. To find out the attainment level of students at the end of class IV

HYPOTHESES

1. Non-detention policy will reduce the percentage of drop-out at primary stage of education.
2. There is difference of proportion of drop-out between boys and girls at primary stage of education.

METHODOLOGY

Sample

Four schools were selected randomly from Magrahat I Block of South 24 Parganas district The sample of the study was 1608 students who were admitted to class I during the academic sessions 1974 to 1988

Tools

The following tools were used in the study·

- (i) Questionnaire on general information of the school
- (ii) Students attendance registers of the four classes I to IV during the academic year 1973 to 1994-95
- (iii) Attainment level test in Bengali, arithmetic and environmental studies This test was prepared by SCERT, West Bengal in collaboration with Indian Statistical Institute, Calcutta.

STATISTICAL TREATMENT

For quantitative analysis of data percentage, mean, S.D. t-value and z-value were calculated Qualitative analysis was done during visits to schools and informal discussion with headmasters and teachers of the schools.

LIMITATION OF THE STUDY

Keeping in view the limitation of time and money for M.Phil work, the study was limited to four schools in one block of South 24-Pargana district

COLLECTION OF DATA

Data was collected from the period 1974-88. The information regarding drop-out and stagnation were collected from school's attendance register Headmasters and teachers were interviewed to assess evaluation system and to get general information of the school Attainment level test was administered on students who have completed class IV to assess their attainment level.

ANALYSIS AND INTERPRETATION OF RESULTS

In this study the period (1974-88) was divided into three phases. These the first phase (1974-78), i e., before declaration of non-detention policy, the middle phase (1978-83), i.e., implementation period and the second phase (1984-88), i.e., after declaration and implementation of non-detention policy. Analysis of data was done on first and second phase

GENERAL INFORMATION ABOUT THE SCHOOL

The study shows that out of four schools, three schools hold classes I to IV in a single big room without any dividing wall separating the classes. In another school four classes were held in a big room but divided into four classes by bamboo fencing. In one school a single teacher was found to manage all the four classes Teaching aids like chalk, duster and blackboard were available in all the schools though their condition was very poor. Only one school had maps and globe as teaching aids.

STAGNATION AND DROP-OUT OF STUDENTS IN PRIMARY EDUCATION

1 Difference of stagnation of students in three classes (I, II, III) in two phases.

TABLE I

Phases	*Stagnation of students in Class I (%)*	*Stagnation of students in Class II (%)*	*Stagnation of students in Class III (%)*
First	65.52	16 47	18.84
Second	57.42	10.59	17.52

The data indicate that the percentage of stagnation of students is gradually decreasing in class I, class II and class III from first phase to second phase, i.e , after declaration of non-detention policy. The data also indicate that the percentage of stagnation in class I is greater than class II and class III (cohort shown).

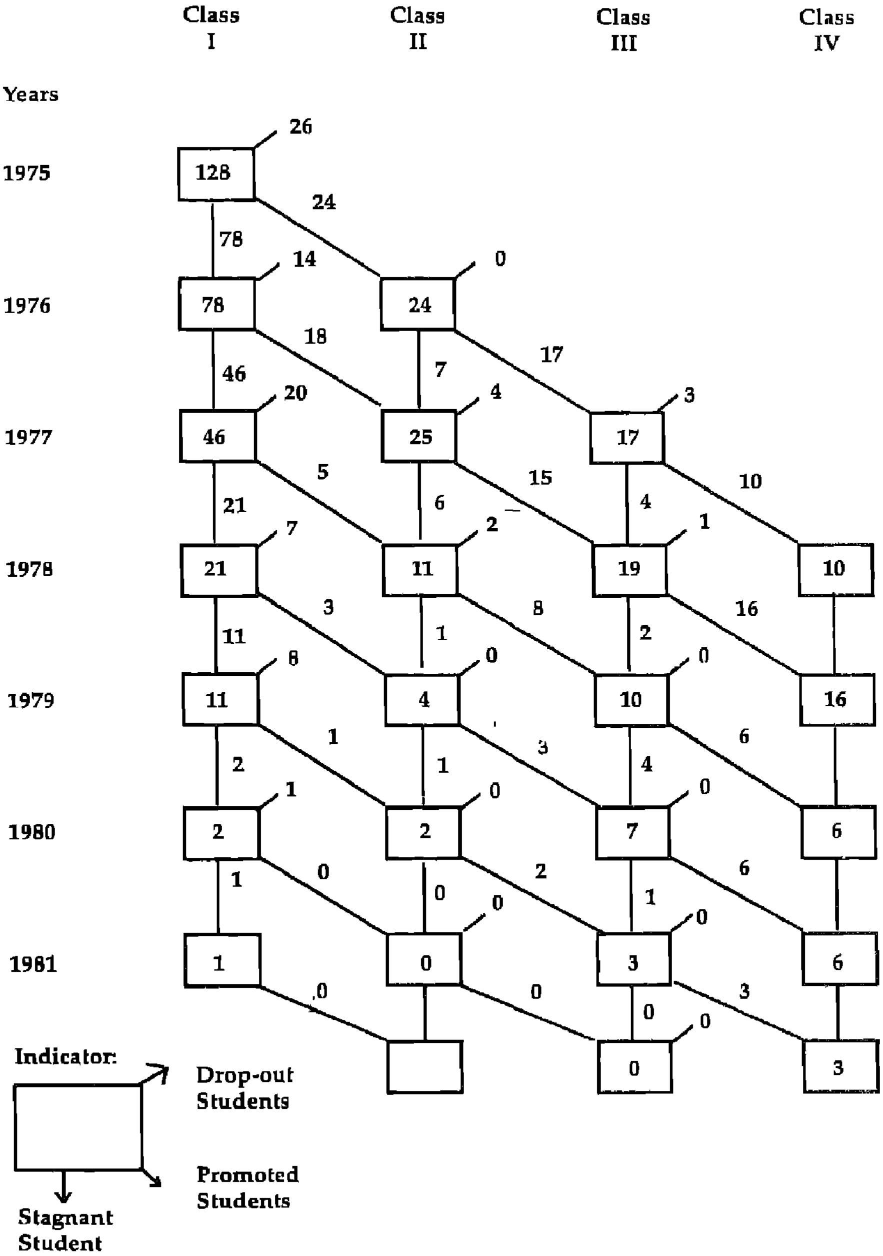
2. Drop-out of students in different classes from 1974 to 1988

3. Drop out of students reaching Class II, Class III and Class IV in two phases.

4. The z-values for the comparison of the proportion of stagnant students in class I (2.77 S) and (22.15 S) are significant But the z-value for class III (0.38 NS) is not significant It indicates that the proportions of stagnant students is significantly less in the second phase than the first phase particularly in class I and class II.

COHORT 1

Cohort on Stagnation and Drop-out of Students in Primary Eduation in 1975



COHORT 2
Cohort on Stagnation and drop-out of Students in 1987

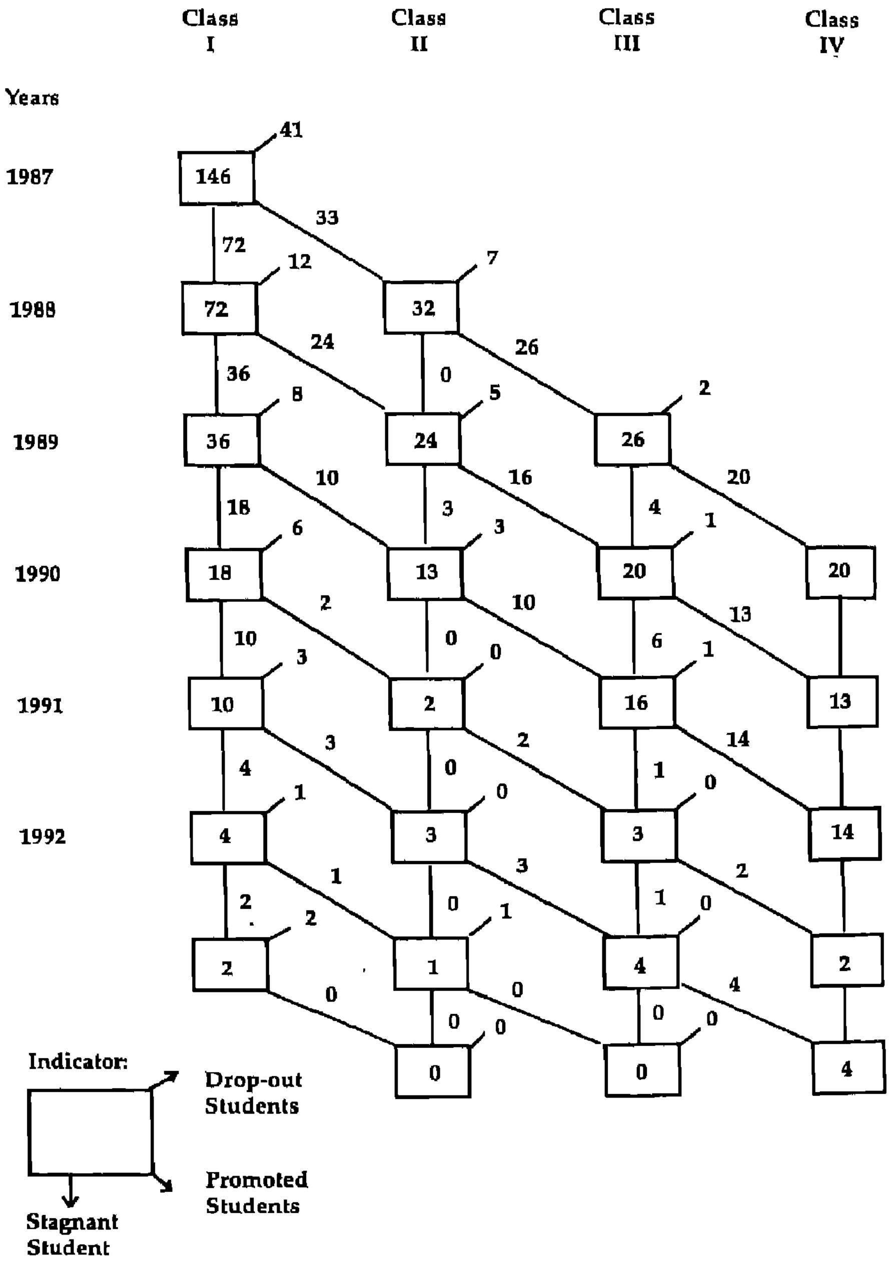


TABLE 2

Year of admission to Class I	*Total No of students admitted to Class I*	*Drop-out before arriving at Class II*		*Drop-out before reaching Class III*		*Drop-out before reaching Class IV*		*Completed class IV*	
		No of students	*% of students*	*No.of students*	*% of students*	*No. of students*	*% of students*	*No of students*	*% of students*
1974	97	41	42.27	60	61 86	77	79 39	20	20 61
1975	128	77	60 16	83	64 84	87	67 97	41	32 03
1976	78	42	53.84	46	58 97	56	71 79	22	28 21
1977	90	42	46 67	51	56 66	61	67 78	29	32 22
1978	100	36	36 00	46	46.00	57	57 00	43	43.00
1979	90	30	33 33	36	40 00	43	47 78	47	52.22
1980	142	76	53 52	82	57 74	95	66.90	47	33 10
1981	89	39	43 82	45	50 56	55	61 80	34	38.20
1982	83	30	36 15	34	40.96	45	54 22	38	45 78
1983	55	18	32 72	22	40 00	25	45.45	30	54.55
1984	132	53	40 15	64	48 48	75	55 81	57	43.19
1985	114	48	42 11	59	51.75	69	60 53	45	39.47
1986	145	71	48.97	81	55 86	90	62 08	55	37 92
1987	146	72	49 32	88	60 27	93	63.70	53	36 30
1988	119	44	36.97	50	42 01	64	53 78	55	46.22
Total	1608	719	44 71	84.7	52 57	992	61 69	616	38 31

Table 2 shows the drop-out students in different classes (II, III & IV) from 1974 to 1988. The table indicates the gradual decline in the percentage of drop-out in different classes.

TABLE 3

Phases	*Drop-out of student before reaching class II*	*Drop-out of students before reaching class III*	*Drop-out of students before reaching class IV*
First	48 28	58 01	68 56
Second	43.90	52 13	59.60

Table 3 indicates that the trend of drop-out of students is greater before arriving at class IV than before arriving class III and class II.

5. The z-value for the comparison of proportion of drop-out students in class IV (3 12 S) and class III (1.98 S) are significant. But in class III (1 48 NS) it is not significant It indicates that the proportion of drop-out

students in class IV and class III are significantly lower in second phase than in first phase

6 It was found the t-value (0.62) for comparison of the number of years taken by the students to complete class IV is not significant Therefore it may by concluded that there is no significant difference of the number of years taken by the student to complete class IV between the two phases, i.e., before and after declaration of non-detention policy.

7. The z-value (2.12) indicates that the proportion of drop-out girls is significantly higher than the boys. Therefore it may be concluded that the percentage of drop-out of female students is greater than male students at primary level. In this connection the hypothesis no.2 hold good in the study

8 It was found that the performance of the student is better in environmental studies (59.52 Mean) than that of Bengali (41.2 Mean) and arithmetic (53.86 Mean)

9. The data indicates that non-detention policy was not implemented in the sample schools undertaken for the study Though there is a decrease in the rate of drop-out from first phase to second phase but it cannot be said that the reasons behind decrease in drop-out is due to the implementation of non-detention policy. So in this connection hypothesis no. 1 is upheld. The reason behind decrease in the rate of drop-out from Ist phase to 2nd phase were not studied in this study

While visiting schools and discussings with the headmasters and teachers, it was revealed that in all the schools students are detained in almost each classes, i.e., in class I, class II, class III and class IV. The gradation of the subjects like Bengali, arithmetic, history, geography and physical science is done through half yearly and annual examination. Teachers are not sufficiently conversant with the scientific method of gradation to be awarded to the students. The schools did not have any provision for remedial teaching. The curricular activities like dancing, singing, recitation, cleanliness, etc., are not taught. No special care has been taken to teach the weaker students individually. It was found that the teachers are not fully aware of non-detention policy and are not trained to implement the policy.

RECOMMENDATION

It was found from the study that mere declaration of non-detention policy is not enough to reduce the root cause of stagnation and drop-out. To make the declaration more effective and fruitful the following recommendation may be given on the basis of obtained results. Teachers in the primary stage are to be well acquainted with the nature and scope of non-detention policy Non-detention policy also includes modern system of evaluation diagnosis of students for the causes of under achievement or failure In this connection Kothari Commission (1964-66) is of the opinion that the primary stage classes I to IV should be treated as unified whole, so that students may, according to their capacities, proceed on from one stage to another. In places where this arrangement is not possible, class I and II may be taken as a unit and students may be divided into two groups as slow and fast learners As a result of this process continuity and flexibility will be maintained.

It can be suggested that West Bengal Primary Education Board in collaboration with Education Directorate may conduct seminars, refresher courses, workshops for primary teachers to update their knowledge in the modern technique of evaluation, remedial teaching and to prepare diagnostic tests. Arrangement should be made for supply of textbooks, learning material and teacher guide in the beginning of the session The panchayat in the rural areas and municipality in the urban area should have close contact with the development of the primary school They may organise meeting with the teachers and guardians to discuss their children's problem. They also may offer incentive and encouragement both to the guardians and students for completing primary education In this regard Government of India announced midday meals to the children of primary schools of few districts. It can be suggested that the two pillars of scholastic world, namely, the home and the school should understand each other better.

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Classroom Reorganisation: A Challenge for Universal Retention of Females

J. Ray

RESEARCH BACKGROUND

Female education has been assuming importance since late 1960s, when the Education Commission (1964-66) observed that "the fulfilment of the constitutional goal is essentially the problem of educating girls up to VIII standards." Educating girls is not only important for the fulfilment of the National goal, but also for the development of the nation. Development of the nation depends on development of human resources and the development of human resources is said to be achieved through education (National Policy on Education, 1986, p. 11). In this regard, education plays a catalytic role. Despite of this, the educational sector in general and female education sector in particular has been a much neglected sector expressing poor participation rates at the levels of inception For instance, girls' participation rates with reference to enrolment, retention and achievement is very poor. Orissa is said to have poor participation rates of girls at primary level of education.

Orissa possesses a higher sex ratio (971) than the national average (927) Almost half of the Orissa population is literate (about 50 per cent). But only 35 per cent of females against 63 per cent of males are literate. That is to say, although Orissa has a higher sex ratio, yet in terms of literacy, females constitute a little more than half of the male literate.

The school enrolment ratio, particularly female enrolment ratio, is low in Orissa. During 1993-94, 32 per cent of girl children in Orissa are never-enrolled in school which constitutes 89 per cent of total never-enrolled children in the age-group of 6-10 of the state. According to the 42nd round of the NSS data, it is found that in rural areas the never-enrolment rates of girls in Orissa in the age-groups of 6-11 and 6-14 are 57 per cent and 56.3 per cent respectively. In urban areas, the concerned figures are 33.8 and

29.1 per cent respectively When Orissa is compared to the 17 major states in India in relation to never-enrolment, Orissa possesses 5th and 4th largest proportion of girl children never-enrolled in the 6-11 age-group in both rural and urban areas respectively. This trend is true in case of 6-14 age-group (P Visaria, 1992)

To corroborate this finding, a study by Maya Shah (1990) predicts that Orissa will not achieve hundred per cent enrolment of girls even in the year of 2000 A.D. This implies that the primary schools in Orissa are running and will be running by leaving quite a sizeable proportion of potential girl children out of school premises whose participation is all the more important for fulfilment of constitutional goals as well as for national development. The recurring governmental efforts are hereby proved to be insufficient, improper and defective, somehow or other, in achieving the universal enrolment of girls by A.D. 2000.

The constitutional goal (UEE) deals with three aspects i.e., universal enrolment, universal retention and universal achievement. In case of school attendance of Orissa, according to the 42nd round of NSS data, the rate of girls' attendance in school in the age-group of 5-9 in rural areas is 44.9 per cent and 66.6 per cent in urban areas. In the age-group of 10-14, the girls' attendance rate is 19 2 per cent in rural areas and 71 2 per cent in urban areas The ranking position of Orissa among 17 major states expresses that Orissa ranks 11th in the girls' attendance rate in both the areas in the age-group of 5-9, and in the age-group of 10-14 it ranks 17th in rural and 12th in urban areas During the year 1993-94, the drop-out rate of girls in the age-groups of 5-10 and 11-14 is found to be 51 per cent and 74 per cent respectively. In short, the pertaining data assume that higher the chronological age of girls, lower is that school attendance rate and higher the age, higher the drop-out rate of girls in the state.

Examining this aspect, questions come to mind that:

(i) why a girl child after enrolling her name in the school register, withdraws prematurely before completing a given level of education for which she is enrolled initially,

(ii) how far the school, society and individual factors are responsible for her withdrawal, and

(iii) given the enrolment, how far the classroom is able to hold until they complete it.

A brief review of the studies on school condition, quality of school facilities and the retention of girls in primary schools revealed that the school conditions are far from satisfactory, teacher-pupil ratio is very poor; teachers are less qualified and trained; teachers are not sincere in their duties; schools are provided with poor facilities; school organisation pattern, poor supervision system and inadequate financial investment contribute towards low growth of girls in schools. Besides, study also reveals that retention of girls is better where teachers stay at headquarters; incentives and facility for games; school environment and teachers courtly behaviour has a positive impact on the retention of girls in schools (Rajpati Devi 1985, M.C. Sharma 1982; Shantilal Gupta 1983 and J. Ray 1988). A study conducted on school quality in 120 primary schools of Dhenkanal districts, Orissa expressed a negative correlation (-0 72) between school quality and drop-out rate of girls. With the help of regression method the study also calculated that the school quality accounts for 47 per cent on the drop-out rate of girls at primmary levels of education. The quality of school was studied on the basis of five major levels of school, i e., (i) School management, (ii) School environment, (iii) Educational environment, (iv) School supervision, (v) School and community relations. Each major level deals with various sub-components. The study is limited in analysing the details of sub-components of each major level (J. Ray 1992). To be brief, the summary of review of studies indicates that the third issue, i e., the holding power of classroom organisation in arresting the drop-out rate of girls is out of touch, assuming having no contribution in fulfilling the constitutional goal.

Considering the classroom teaching-learning process as the nexus between school and students, the present paper attempts to probe into the classroom education and the universal retention of girls at primary level of education. The important activity of a school takes place in a small unit called classroom, where many un-matured and a matured mind meet together, for a couple of times and seek cooperation from each other for the dissemination of knowledge through teaching and learning process. Learners will take interest in learning so long as they feel classroom learning is interesting. Therefore, making the whole classroom interesting to hold the girls until they complete their learning should be the prime concern of teacher, school organiser, curriculum maker and the policy makers at the governmental level.

METHODOLOGY

Objectives

Given the above backdrop, the present paper studies:

(i) the extent of drop-out rate of girls at primary level;

(ii) how far the educational progress in the classroom organisation accounts for the universal retention of girls at primary levels of education;

(iii) whether an improved and well organised classroom environment will lead to achieve the constitutional goal, and

(iv) some policy implications.

School Quality

The school outcome may be determined by the quality of school The efficiency of school quality may be analysed on five levels such as·

(i) School environment
(ii) School management
(iii) Educational progress of the school
(iv) Supervision
(v) School and community interaction.

Considering the above five levels, a gradation schedule has been prepared on the basis of the one prepared by SCERT, Maharashtra for primary and secondary schools The schedule is based on the basis of objective evaluation. The information is required to be filled in by two point and five point scale, i.e., (Yes/No) and (ABCDE). The criteria for quantifying the qualitative types of answers are as follows.

	Scale	Marks
80-100%	A	4
60-79%	B	3
40-59%	C	2
25-39%	D	1
Below 25%	E	0

Items allotment for Primary Schools

		Marks
1.	School environment	125
2.	School management	80
3.	Education progress	340
4	Supervision	65
5	Schools and community interaction	40
	Total	650

The most important activity in the school is the teaching-learning activity Students will maintain interest in the school if they acquire education in an interesting way, which ultimately depends on teacher's efficiency, their training and their mode of planning day-to-day teaching co-curricular activities The educational progress has been considered which deals with the major portion of the model.

The educational progress level of primary schools which carried out 340 marks deals with six components. They are.

Educational progress	340
(i) Learning	77
(ii) Teaching	68
(iii) Training	35
(iv) Case of aids	30
(v) Evaluation	80
(vi) Co-curricular activities	50

Under this major level, a number of questions are asked, the component of learning, which carries 77 marks, 20 questions are asked, the teaching which carries 68 marks, 23 questions are asked; the training which carries 35 marks, 5 questions with sub-categories are asked; 9 questions are asked in use of audio-visual aids component which deals with 30 marks; evaluation with 80 marks deals with 12 questions and finally co-curricular activities with 50 marks deals with 12 questions. Most of the questions were asked on five point scale. The present paper does not aim at grading the school, therefore the average percentages have been calculated to study the retention of girls.

Drop-out Rate

The methodology adopted in estimating the drop-out rate in girls education in the sample schools is as follows: Following Thigale's method, the drop-out rate of girls has been calculated. First of all, the actual number of drop-outs in each standards have been identified The drop-out, hence refers to one whose name is removed from the school register but has not received the transfer certificates, in the course of a particular level of education. Secondly, the total enrolment in the given level of education is computed. The total enrolment in a given level of education includes, the enrolment in the initial year, new additions in the course of the given level of education, and repeaters of previous years in the course of a given level of education. From this total, the number of cases who have withdrawn transfer certificates from the school in the course of a given level of education and the death cases are excluded. Thirdly, the actual number of drop-outs are taken as percentages of the total enrolment in a given level of education In short, the drop-out rate may be termed as,

$$\text{Drop-out rate} = \frac{\text{Number of drop-outs}}{\text{Total enrolment}} \times 100$$

Sample

Orissa houses a total of 41,604 primary schools However, for a quick study ten primary schools (classes I-V) five from Jagatsinghpur district and five from Khurda district were randomly selected for the present study. All the sample schools are co-educational schools Of the ten schools, 8 schools are rural and 2 are urban schools

Districts at a Glance, 1994

	Population	*Literacy Rate*			*Enrolment*	*Schools*	*Teachers*
Jagatsinghpur	1014000	65.78	78.41	52.94	110252	1152	2765
Khurda	1502000	67.72	78.74	56.39	230687	1290	3096
Orissa	31660000	49.09	63.09	34.68	3815000	41604	99865

The Data

Data pertaining to the general information on sample schools, enrolment, retention, failure, number of successful girls, drop-outs, etc , were collected through a survey schedule The data on educational progress of a classroom was collected through a questionnaire prepared for head teachers of schools during 7 and 8 March 1996.

DISCUSSION

Statistical measures based in this study are percentages, correlations, simple and multiple regressions, etc Following the Thigale's method the drop-out rate for each school and the average drop-out rate are calculated.

A question under the component of training has been asked to find out the total number of teachers in school. It is observed that five schools out of ten have two teachers, two schools have three teachers and three schools have three and a little more than three teachers in total That is to say, although the schools have I-V classes, yet they are not provided with at least one teacher per one class Besides, the ratio of teacher-pupil is also very high. This high ratio is a barrier for the development of human resources at the initial years of learning, where, these small children need special attention and came from their teachers along with learning This has been clearly explained in National Policy on Education, 1986 that, "a human being is a positive asset and a precious national resource which needs to be cherished, nurtured and developed with tenderness and care,coupled with dynamism" (p 2).

The average drop-out rate of girls calculated for ten primary schools (Classes I-V) is 41 85 per cent. Out of ten, five schools could express above the average drop-out rate However, the variation between the highest and lowest drop-out rate is found to be very high, i.e., almost double (26.66-52.29 per cent).

TABLE 1

Sl. No	*Learning*	*Teaching*	*Training*	*Audio-visual aids*	*Evaluation*	*Co-curricular activities*	*(Total) Educational Progress*	*Drop-out Rate (%)*
1.	54.55	41.18	48.57	13.33	35 00	14 00	37.06	26.66
2	64.94	36.76	62 86	10.00	27.50	10.00	37 35	53.57
3	57 14	47 06	80.00	16.67	37 50	18.00	43 53	31 25
4	76 62	51.47	77 14	23 33	40 00	20 00	50 00	29 52
5.	50 65	36.76	42 86	10.00	35 00	08 00	33 53	51 22
6	62.34	32 35	48.57	10 00	33 75	10 00	35.88	48.20
7	45 45	30 88	54.29	13 33	37.50	12.00	33.82	52 29
8.	59 74	54.41	82 86	16.67	·41 25	16 00	46.47	39 22
9	54 55	47.06	51 43	20.00	37 50	10.00	39 12	41 28
10.	42.86	48.53	65.71	16.67	32 50	12 00	37 06	45.33
Total	56 88	42.65	61.43	15 00	35 75	13.00	39.38	41 85
r =	–0 18	–0 64	–0 29	–0 60	–0 40	–0 71	–0 59	

The average rate of quality of learning activities computed for ten primary schools is 56.88 per cent Five out of ten schools fall below the average rate. However, the variation between the highest and lowest rate is wide ranging (76.62-42 86 per cent) The average rate computed for obtaining the teaching activities is 42.65 per cent Of the ten, five school could have below the average rate of teaching activities. The variation between the highest and lowest rate is about 25 per cent. The mean rate of quality of training of teachers teaching in ten schools is 61.43 per cent. The variation is about 35 per cent. The average rate of using audio-visual aids in the class room is 15 per cent. The variation is about 10 per cent between the highest and lowest rates.

The mean rate of quality of classroom evaluation computed for ten primary schools is 35.75 per cent. The gap between the highest and lowest rates is about 15 per cent. The average rate of quality of participation of teachers and pupils in the co-curricular activities obtained for ten primary schools is 13 per cent. Only 4 schools out of ten have the above average rate of co-curricular activities The variation is 12 per cent between the highest and lowest rates. On the whole, the mean rate of quality of classroom educational progress which includes the components of learning, teaching, training, audio-visual aids, evaluation and co-curricular activities is found to be 39.38 per cent. The variation is about 17 per cent between the highest and lowest rates (50 00 and 33 53 per cent respectively). Of the components, training component could express highest rate (61 48 per cent) followed by learning and teaching activities. However, the quality of the components of use of audio-visual aids and co-curricular activities could express a lower average rates (15 per cent and 13 per cent respectively) in comparison to other components

With the help of rank correlation method, the relationship of drop-out rate of girls and the quality of educational progress was computed The correlation is found to be –0.59 between the two variables. The expected sign of negative correlation expresses that if the rate of quality of educational progress increases, there will be a decrease in the drop-out rate of girls at primary schools. The rank correlation computed for other components of educational progress also expresses negative relationship with drop-out rate. Within the components, the component of participation in co-curricular activities is highly negatively (–0 71) related with drop-out rate followed by teaching component (–0.64) and use of audio-visual aids component (–0.60). However, students participation or learning and teachers training components are found to be negatively related with drop-out rate with a lower amount (–0.18 and –0.29) That is to say, there is high degree of correlation between co-curricular activities, and drop-out rate and small degree of correlation between the components of learning activities, teachers training and drop-out rate

The average rate of drop-out in primary school is regressed on the quality of educational progress with the help of single regression analysis

TABLE 2

No of Schools	*Drop-out rate*	*Quality of Educational Progress*
1	26 66	37 06
2.	53.57	37 35
3	31 25	43 52
4.	29 52	50 00
5	51 22	33 53
6	48.20	35.82
7	52 29	33 82
8.	39 22	46.47
9.	41 28	39.12
10.	45 33	37 06

Regression Output

Constant	88.82438
Std.Err of Y	7 914814
R Squared	0.436289
No. of observations	10
Degrees of freedom	8
Coefficient	–1.19269
Std. Err of Coef.	0.479865

The coefficient of determination (R^1) is (0 44). In other words, the model explains 44 per cent variation in the drop-out rate. Thus, the quality of educational progress accounts for 44 per cent of variation in drop-out rate in the 10 primary schools The highly significant coefficient suggests that a change by one percentage points in the quality of educational progress is likely to bring about a change of 1.19 per cent points in the drop-out rate. In other words, an increase (or decrease) of one percentage progress will bring about a decline (or increase) of 1.19 per cent in the drop-out rate. Thus, the model explains that the quality of educational progress in a classroom is very important in determining the girls' drop-out rate in primary school.

In order to assess the differential impact of each component of the quality of educational progress on the incidence of drop-out in primary schools Six components of the quality of educational progress are treated as independent variable in the multiple regression model. The explanatory power (R^1) rises in the equation to (0.94). That is to say, the model explains 94 per cent variation on the drop-out rate. In other words, when the quality of eucational progress is treated as a single independent variable in the regression model, the R^1 is 0.44; but when the six independent variables in the model, the R^1 rises to 0.94. However, of the six components only 520 components, i.e., the component of teaching activity and the component of participation in the co-curricular activity, exert greater influence on drop-out rate in primary schools. That is to say, an increase in the teaching component and the component of co-curricular activity will bring down the drop-out rate 1.01 per cent and 3.80 per cent respectively.

Regression Output

Constant	61.0132
Std. Err of Y Est	4.308802
R Squared	0.937345
No.of observations	10
Degrees of freedom	3
Coefficient	0.011633, –1.01082, 0.797246, 0.674972, 0.385012

Std Err of Coef	0 172286, 0.366078, 0 212076, 0.636163, 0 523352, 0.836313

CONCLUSION

To sum up, this paper has analysed the relationship between the quality of educational progress and the drop-out rate of girls The drop-out rate is negatively correlated with educational progress Among the six components of educational progress, the component of co-curricular activities is highly negatively related with drop-out rate followed by teaching and use of audio-visual aids components. The quality of educational progress determines the drop-out rate. The most important component of determining the drop-out rate is the participation of co-curricular activities followed by teaching component

On the basis of findings the following suggestions arise·

(i) Primary schools with high teacher-pupil ratio need to be supplied by minimum five teachers at least one teacher per class so that the teachers will be able to pay special and personal attention to each and every child in a classroom. In other words, the speedy run of teachers for the completion of the course without methodology and plan that too by handling hundreds of small children together will be minimised. There will be an improvement in the teaching component.

(ii) Children's participation in the co-curricular activities along with the cooperation of teachers will serve as a boost for reducing the drop-out rate.

(iii) A negative rank relationship was found between the components of quality of educational progress and drop-out rate. Therefore, it is suggested that according to the gradation model all the classrooms, educational progress of primary schools need to be graded and on the basis of their grade points and grades, measures should be taken to see that they possess "A" grade. Therefore, reorganisation of the classroom should be at initial stage for arresting the drop-out rate.

(iv) Since the sample is very small, generalisation is not possible. Therefore, it is suggested that government should take step to see the present position of schools in the state through gradation of schools and accordingly planning should be carried out to reorganise the classroom and schools at the state as well as country.

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A Study of Weaker Section Child's Ability to Deduce Verbal Transitive Inference

A.C. Pachaury

The study is based on the premise that linguistic abilities, perceptual development and abstract thinking are poorly developed in weaker section children

Seventy-eight children of seventh grade, belonging to varying ethnic groups of rural background, the Baiga, the Gond, the OBC Muslims, the OBC Hindus and Caste Hindus comprised the sample Transitivity tasks involving the homogeneous and heterogeneous adjective premises related to colour, height and weight attributes, constructed by the author (patterned on Piaget's tasks) were used.

Results were analysed separately for each of the five ethnic groups on different tasks. None of the ethnic group's performance had reached the criterion of 75 per cent as set forth by Piaget. About 60 per cent of the subjects failed to deduce verbal transitive inference. The study reveals that the development of verbal logical thinking is delayed in Indian children

The study has implications for nurturing cognitive competence, sharpening information processing abilities through real life experience, logico-mathematical abilities through hand-on experiences and providing multicontextual learning that emphasises self discovery on the part of the learner. It also suggests that curriculum and its transaction be made more suitable to the weaker section which requires research inputs in the development of curriculum and training of teacher

According to Piaget (1958), cognitive development of the child begins at birth and continues upto the age of fifteen years or so in an invariant order of four stages These stages are : (a) the sensorimotor stage (0-2 years), (b) the pre-operational stage (2-7 years), (c) the concrete operational stage (7-11/12 years); and (d) the formal operational stage (11/12 to 15/late adolescence). Logical thinking dealing with the concrete materials, i.e., experiences with *here-and-now objects, things,* etc., begins to develop around the age of seven years in the normal child Operative transitivity banking on the concrete stimuli like that of A>B, B>C, therefore, A>C also develops at about seven years of age In case, the three-term series are presented in the linguistic format, then such tasks are generally solved at 11/12 years of age (Piaget and Inhelder, 1958), instead by the seven-year old Ss. There are many school learnings that need understanding of the science and other content-based concepts that hinge on the ability of the learner to deduce transitive inference. Ordering of the objects etc. makes use of the attribute(s) on which to deduce relations. Research studies have shown that linguistic abilities (Bernstein 1962; Deutsch 1987) perceptual development (Sandler et al 1972; Spieker 1971) and Piagetian cognitions (Pachaury 1991a, b; 1993 a; 19951a) were poorly developed in weaker section children

The major purpose of this study was addressed to seek answer to the research question·

Does there exist any difference among the seventh grade weaker section children of varying ethno-rural background on the ability to deduce verbal transitive inference?

Specifically, the following null hypothesis is tested. There does not exist any significant difference among the seventh grade weaker section children of varying ethno-rural background on the ability to deduce verbal transitive inference banking on the homogeneous and hetergeneous adjective premises related to colour, weight and height attributes

A subsidiary purpose of the study was to confirm research evidence made by Odom and Coon (1976) that the task format affects the performance. Hence, the following research question was generated:

Does there exist any difference among the seventh grade weaker section children of varying ethno-rural background on the ability to deduce verbal transitive inference between the tasks that bank on the homogeneous and heterogeneous adjective premises related to colour, weight and height attributes?

A subsidiary null hypothesis, therefore, tested was.

There does not exist any significant difference among the seventh grade weaker section children of varying ethno-rural background on the ability to deduce verbal transitive inference between the tasks that bank on the homogeneous and heterogeneous adjective premises related to colour, weight and height attributes For both the null hypotheses Alpha at 5 per cent level of confidence was fixed.

SAMPLE

In view of the research questions and null hypotheses created for testing, the faculty experience (RIE, Deptt of Education, Bhopal) was utilised to locate a rural setting with varying ethnic background. Therefore, *lab-area* of the *Shadol DIET* was considered appropriate for data collection All the 78 Ss were enrolled in seventh class of the Government schools. Their *ethnicity* *and age* were collected from the school registers The age of the Ss ranged from 11 to 13 years. A few of them also had age of 14-years as well at the time of the data collection. Table 1 presents their demographic characteristics.

TABLE 1
Demographic Characteristics of the Sampled Subjects

Ethnic affiliation	*Boys*	*Girls*	*Total*
Tribal			
Baigas	18	3	21
Gonda	10	—	10
Other Backward Class			
Muslim	12	9	21
Hindu	10	7	17
Caste Hindu	8	1	9
	58	20	78

METHODOLOGY

Tasks and Their Scoring

Transitivity tasks banking on the homogeneous and heterogeneous adjective premises related to colour, height and weight attributes patterned on the Piaget's (1958) task were constructed by the author (Pachaury 1993b) and were used in the earlier studies as well (Pachaury 1994, 1995a, 1996c in Press). Each correctly deduced inference received a score of one and incorrect inference was given a score of zero. Scores, therefore, ranged from 0 to 2 on each of the tasks.

Data Collection

Data were collected through a cyclostyled sheet containing three tasks of each category in Hindi language. The respondent had to write only one word deduction made by him/her on the basis of the adjective premises for each inference. An example of the homogenous and the heterogeneous adjective premises based task translated in English is given below:

(*a*) *Homogeneous adjective premises*
Mohan is fairer than Shyam,
Shyam is fairer than Hari,
Who is fairest?
Who is darkest?

(b) *Heterogeneous adjective premises*
Sudha is shorter than Meena
Sudha is taller than Gita
Who is shortest?
Who is tallest?

Criterion of Acceptance of Performance

Piaget (1958) has used 75 per cent as the criterion of acceptance of performance on a task by a target group. It was also used in this study as was done for the earlier studies conducted by the author related to Piagetian cognitions on the Indian children and adults (Pachaury 1975-1994 cited in 1995b reference).

Results

Table 2 provides overall mean scores on the administered transitivity tasks and also for the homogeneous and heterogeneous adjective premises based individual tasks related to colour, weight and height attributes, respectively. Since, for each kind of the task, score ranged from 0 to 2, it is obvious from the obtained mean values that none of the cultural group Ss even reached the median score of one on any of the tasks. For the sampled Ss, the mean values ranged from lowest of 0.04 to highest of 0.40 only. On the basis of these mean scores, it is inferred that these weaker section childrens' ability to deduce verbal transitive inference banking on the homogeneous adjective premises is limited to 40 per cent only, i.e., 60 per cent of the sampled Ss were unable to deduce correct inferences related to colour, weight and

TABLE 2
Mean Scores Obtained by the Ss of the Different Cultural Groups on the Tansitivity Taks

Cultural Group		*Transitivity Tasks*						
		Homogeneous premises			*Hetrogeneous premises*			*Overall Mean*
	N	*I*	*II*	*III*	*IV*	*V*	*VI*	
Baiga	21	0.28	0.23	0.09	0.19	0.04	0.09	1.16
Gond	10	0.40	0.40	0.20	0.30	—	0.10	1.00
Other backward Classes								
(a) Muslim	21	0.28	0.19	0.28	0.19	—	0.04	1.00
(b) Hindu	17	0.23	0.23	0.11	0.17	—	0.05	0.82
Caste Hindu	9	0.33	0.22	0.22	0.22	0.22	0.11	1.33

height attributes, respectively. The percentage has dropped down for the heterogeneous adjective premises tasks to 30 per cent for colour, and it has further dropped down to 4 per cent for height task (VI). Under the *same eco-habital* of small villages, overall performance of the caste Hindu children had been better than that of the OBC Muslim and Hindu Ss. On the homogeneous adjective premises tasks, performance of the Baiga and the Gond Ss had been the same as for the caste Hindu Ss

Table 3 depicts critical and obtained values of the Omega statistic(w) for the seventh grade Ss who belong to varying ethnic groups for the homogeneous (I-III) and heterogeneous (IV-VI) adjective premises tasks related to colour, height and weight attributes, respectively

Table 3 reflects that no significant difference exists among the seventh grade weaker section children of varying ethno-rural background on the ability to deduce verbal transitive inference banking on the homogeneous and heterogeneous adjective premises related to colour, weight and height attributes as the obtained values of w are less than the critical values of it at 5 per cent level of confidence. Thus the null hypothesis is retained for the sampled Ss of the seventh grades However, significant differences favouring caste Hindu Ss exist on the weight task (V) banking on the heterogeneous adjectives premises against ethnic groups of the Gonds, the OBC Muslim and Hindu ($w = 0.69$ in each case $p < .05$).

In order to test the subsidiary null hypothesis, the Omega statistic were also calculated for the contrast-pair of the items (I-III... IV-VI) for each of the ethnic groups. The following significant differences were found (Table 4).

The Baiga Ss

Their performance was significantly better on the homogeneous adjective premises task related to colour (I) than on the structurally equivalent task related to height (III) ($w = 0.50$ $p < .05$) and also on the structurally dissimilar tasks related to weight and height (V and VI, $W = 0.64$ and 0.51, $p < 0.05$). Similarly, performance on the homogeneous adjective premises weight task (II) was significantly better than on the structurally similar tasks related to height (V) and weight (VI) ($w = 0.58$ and 0.45, $p < 0.05$).

An anomalous, but significantly better performance on the higher ability (structurally dissimilar) task (IV) has been observed than on the lower ability task-III (structurally similar) for the sampled Baiga Ss of this study ($w = 0.49$, $p < 0.05$)

The Gond Ss

Their performance was significantly better on task I than on the tasks V

TABLE 3
Critical and Obtained View of w for Various Pairs of Ss

Cultural pairs	*Critical value of w*	*Obtained values of w for different tasks*					
		I	*II*	*III*	*IV*	*V*	*VI*
Baiga-Gond	0.53	0.01	0.08	0.24	0.19	0.38	0.39
Baiga-Muslim	0.45	0.09	0.09	0.41	0.21	0.39	0.03
Baiga OBC Hindu	0.45	0.23	–	0.09	0.24	0.24	0.04
Baiga-Caste Hindu	0.56	0.04	0.03	0.28	0.17	0.53	0.09
Gond-Muslim	0.53	0.13	0.12	0.19	–	0.36	–
Gond-OBC Hindu	0.55	0.21	0.11	0.13	0.03	–	0.38
Gond-Caste Hindu	0.63	0.08	0.09	0.09	0.09	0.69	0.51
Muslim-OBC Hindu	0.45	0.05	0.12	0.39	0.01	–	–
Muslim-Caste Hindu	0.55	0.09	0.08	0.09	0.09	0.69*	0.17
OBC-Caste	0.57	0.18	0.02	0.22	0.09	0.69*	0.29

***Significant at 5 per cent level confidence.**

and VI (w = 0.94 for both $p < 0.05$) Similarly, their performance was significantly better on the tasks II, III and IV than on the tasks V and VI, respectively (w = 0.64 in each case, $p < 0.05$).

The OBC Muslim Ss

They also performed significantly better on task I like the Baiga and the Gond Ss, than on the tasks V and VI (w = 0.89 and 0.44, $p < 0.05$) Similarly, their performance was significantly better on task II than on task V (w=0.61, $p < 0.05$), task III than on the tasks IV and V (w = 0.81 and 0.46, $p < 0.05$), and task IV than on the task V (w = 0.62, $p < 0.05$).

TABLE 4

Critical and Obtained Values of the Omega Statistic for Varying Ethnic Groups for Different Pairs of Tasks

Cultural Group	*Critical Value of*	*Item Pairs*														
	W	1-2	1-3	1-4	1-5	1-6	2-3	2-4	2-5	2-6	3-4	3-5	3-6	4-5	4-6
Baiga	0.42	0.20	0.50	0.04	0.64	0.51	0.29	0.19	0.49	0.30	0.49	0.19	0.01	0.58	0.45
Gond	0.62	0.30	0.30	0.94	0.94	—	—	0.64	0.64	—	0.64	0.64	0.64	0.64	0.64
OBC Muslim	0.42	1.77	—	0.17	0.89	0.44	0.17	—	0.61	0.28	0.17	0.81	0.46	0.62	0.31
OBC Hindu	0.47	—	0.21	0.11	0.61	0.39	0.21	0.11	0.61	0.39	0.18	0.50	0.27	0.67	0.28
Caste Hindu	0.65	0.16	0.16	0.16	0.16	0.38	—	—	—	0.21	—	—	0.21	—	0.21

The OBC Hindu Ss

For them, significant differences exist on tasks I and II than on the task V ($w = 0.61, p < 0.05$), tasks III and IV than on the task V ($w = 0.50, p < 0.05$).

The Caste Hindu Ss

For the caste Hindu Ss, there does not exist any significant difference either on the homogeneous adjective premises tasks (I to III) or on the heterogeneous adjective premises tasks (IV to VI). For these Ss, there does not also exist any significant difference between the two categories of the tasks administered to them.

Discussion

It is obvious from the results obtained in this study that none of the ethnic groups performance had reached the criterion of 75 per cent set forth by Piaget (1958). This is also true for the caste Hindu Ss. Since most of the Ss were in the age range of 11 to 13-years, their ability to deal with the linguistic format in the deduction of the transitive inference is not yet fully developed in them as proposed by Piaget. In the middle class urban children too of this age, this ability was rather in the formative stage, than in the fully developed form (Pachaury 1995a). Hence, development of the logic of transitivity shows delay, as it is observed for the other Piagetian cognitions in the Indian children and adults (Pachaury 1995b)

In regard to the major null hypothesis tested in this study, *it is retained,* on the ground that there does not exist any significant difference in the ability of the seventh grade weaker section children of varying ethnic-rural background on the deduction of the verbal transitive inferences either of the homogeneous adjective premises or of the heterogeneous adjectives premises (Table 3). As for the subsidiary null hypothesis, it is *rejected,* since in general, the performance of the various ethnic groups had been significantly better on the homogeneous adjective premises tasks, than on the heterogeneous adjective premises tasks (Table 4). Therefore, the research evidence that task format affects performance (Odom and Coon 1967, Pachaury 1994, 1995a) is also confirmed for the sampled Ss of the Baiga, the Gond and the OBC Muslim and Hindu ethnicity. However, this observation does not hold good for the Caste Hindu Ss tested in this study (Table 4).

Piaget (1958) argued that children fail to deduce a transitive inference because they *lack three mental operations* : (a) an inability to make judgements about comparative relationships; (b) an inability to reverse relationship; and (c) an inability to integrate separate pieces of information. This seems particularly true for the heterogeneous adjective premises tasks (IV to VI), because to deduce an inference on such tasks needs construction of second-order *relations-on-relations,* and that young children face difficulty in directing their attention towards task-relevant information (Pick et al 1975) Weaker section children also seem to fail in making use of representation of reality for encoding the information (Pachaury 1989) Therefore, it becomes difficult for them to retrieve the requisite degree of relationship among the encoded information. Probably, it is for this reason that their performance had been poor specially on the heterogeneous adjective premises tasks

Education Implications

Children of 11 to 16-years of age coming from the weaker section of the society, by and large, are concrete thinkers (Pachaury 1989, 1991a, b; 1993a, b; 1994, 1995b, 1996c). Therefore, they do not benefit much from the schooling that predominantly transacts course-contents in linguistic mode. Such categories of the Ss, also show poor development in regard to perceptual discrimination and abstracting abilities (Pachaury 1989) These abilities are needed for proper development of concepts by a learner. Therefore, as a first step, building/nurturing of the cognitive competence of the children, these twin mental processes be sharpened through real life like experiences (Pachaury 1996) In the next step, their logico-arithmetic grouping abilities, i e., classification, seriation, number and logical transitivity together with that of the spatiotemporal groupings (relations of proximity, separation, closure, continuity and spatial relationship and their measurement, coordination of different view points, and horizontality and verticality) be nurtured by making use of the *hands-on-experiences* (Pachaury 1995b A multicontextual learning environment that emphasises self-discovery on the part of the learner would necessarily add to their non-specific transfer skills. Once these cognitive competencies have been adequately mastered, then nurture of their conceptual functioning, i.e., ability to make hypothesis/prediction and their experimental testing shall prove useful in attaining abstract learning. It is hoped, this model of curriculum theorising would better meet the learning needs of the weaker section children, so much talked about these days, than even before Lashing them with a middle class course-structure and linguistic mode of its transaction, therefore, makes schooling out of context for the weaker section students and at best, destroys their self-image/efficacy beyond repair Accountability for the newly drafted programmes, meant for the weaker section children, demands *research inputs* in the development of curriculum and training of the teachers, rather than harping on the individual and/or group-opinions on how these categories of children should be imparted information. Clearly, the stress ought to be on how do these children process information, and what the school can do to sharpen their information processing abilities

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Classroom Processes Leading to Connotative Relativity—A Generative Cause of Primary Level Pupils' Alternative Conceptions

J.K. Mohapatra and S. Das

The investigation examines connotative relativity as a genesis of manifest alternative conceptions with regard to the words, "living," "animal," and "plant."

The subjects for the study included 222 sixth grade students (age group 11-12 yr.) 216 seventh grade students (age group 12-13 yr), from three schools (all English medium including one girls school) and 30 tribal teachers teaching at the primary level The tool for the study, designed by the investigator, was a paper pencil test consisting of 22 items It was administered in a classroom situation having a tension free climate The administration of the tool was followed by structured discussion with pupils Percentages of each group of subjects, giving the correct response to any particular question, were analysed.

It was reported that processes generating connotative relativity have been identified and their effect as a genesis of alternative conceptions in the context of the specific concepts· "Living," "animal" and "plant" has been demonstrated (2) In the world of connotations of scientific terms, every child is a virtual stranger sitting in a uniquely defined cognition-tight compartment of his/her connotative relativity (3) The alternative conceptions generated out of connotative relativity, offer resistance to modification (perhaps) because of its deep rooted reinforcement over years.

The study proposes a number of strategies for modification of the alternative conceptions generated due to connotative relativity The investigators have cautioned that "if special effort is not made to take note of this, and suitably modify the domain of connotative relativity, then in all likelihood meaningful learning of science concepts may not occur."

INTRODUCTION

In recent times an active research programme, based on the constructivist approaches, has made an intensive and extensive study of pupils' alternative conceptions in science. These investigations include identifying and mapping these alternative conceptions, categorising their characteristics, discussing their implications for the teaching-learning process and developing models of teaching-learning. Informative overviews can be obtained from the papers by Driver and Ericks on (1983), Gilbert and Watts (1983), Hashweh (1986), Mohapatra (1989), Duit (1995), Mohapatra (1996), and from the books by West and Pines (1985), Driver, Guesne and Tiberghien (1985), Osborne and Freyberg (1985), Fensham, Gunstone and White (1994) and Glynn and Duit (1995)

However, the findings can have functional value in a classroom situation only if, one

(a) goes beyond the boundaries of individual alternative conception of each pupil and search for a pattern, and
(b) diagnoses possible generative causes that create common alternative conception in a group of pupils

Then one will be perhaps in a position to prescribe strategies to develop formal concept in pupils in a classroom by suitably modifying, erasing or absorbing that common alternative conception

For some time, we have been engaged in identifying such generative causes. In particular, we have proposed and also demonstrated in specific concept domains that Induced Incorrect Generalization (IIG), (Mohapatra (1988); Mohapatra and Bhattacharya (1989) and causes which generate many alternative conceptions which are common to a group of pupils.

In the present study we go a step further and hypothesise that connotative relativity, i.e., the disparity between the meanings attributed to any concept label by the pupils, and that by the teacher in the framework of formal science, is likely to manifest in the form of an alternative conception, common to a group of pupils.

CONNOTATIVE RELATIVITY

The mental picture of a concept, as one perceives it, is defined by the connotations attached to a word or a group of words, expressing the respective concept, its examples/non-examples, its attributes, its complex structures, both concrete and abstract, generated by the interplay of the attributes and its use in daily experience.

In this context it is a known fact that much before a child enters a formal science class he/she is exposed to and hence acquires mental pictures of many diverse concept labels (viz., animal, plant, force, work, reflection, rock, producer, volt, etc.) in a societal and environmental framework Hence, the conceptualisation of a concept, associated with a word/group of words, expressing it, by a learner inside a classroom is likely to be influenced by the corresponding societal and environmental connotations (Piaget 1926) which he/she already possesses and which are probably different from the meanings attributed to the same word/group of words (concept) by the teacher, or by the textbook, or by the formal science.

The difference between the pictures, nay the connotations, which the learner holds and those the teacher desires/attempts to convey could be due to (Freyberg 1985, Freyberg and Osborne 1981);

- the interpretation of word by the teacher in a restrictive, specialised, scientific meaning and by the learner in a more general every-day sense, or vice-versa,
- meaning attributed to an unfamiliar word simply on the basis of verbal association or verbal similarity,
- failure to recognise that some terms have two or more different meanings, and
- construction of ephimeral meanings for words, which the learner is unfamiliar, based simply on adjacent context, "clues."

However, excepting the first one, the rest three have 'individualism' (in the context of the learner) built into them and in a large size class any attempt to handle them will be next to impossible and a luxury, beyond the reach of most of the teachers. So with the intention to search for the genesis of a group alternative conception so that a functional and operational strategy in a classroom situation can be prescribed, we concentrate on the first causation, listed above

At this point an exemplar is in order Let us consider the word "animal " A child is exposed to this word in association with other terms, like "domestic animal," "animal shed," "zoo for animals," "animals are not allowed" (into hospitals), etc. In each of these exposures, the child gradually associates and internalises the *"concrete concept"* "animal" with the *"concrete language"* "animal." We call these languages "concrete" because through the associations he/she comprehends "domestic animal" as a dog, or a cat, or a cow, "animal shed" for cows, horses, "zoo for animals," like tiger, elephant (note that the child rarely thinks of say, "snake" in the context of animals in zoo) and "animals," like "dogs" are not allowed into hospitals Thus a child entering a class on environmental studies at the primary level is in a state of equilibration where a *"concrete concept is shaped in a concrete language "*

An analysis of the various concepts and the connotations associated with the word expressing the concept yields a matrix of four states (Pavlik, Schweers and Popejoy 1982).

$$\begin{bmatrix} \text{Cc} \\ \text{Cf} \\ \text{Fc} \\ \text{Ff} \end{bmatrix} = \begin{bmatrix} \text{Concrete concept shaped within concrete language} \\ \text{Concrete concept shaped within formal language} \\ \text{Formal concept shaped within concrete language} \\ \text{Formal concept shaped within formal language} \end{bmatrix}$$

While teaching the seemingly simple term "animal," the teacher is in the state of Ff where as the child is in the state of Cc, and likes to continue to be there as it does not in any way conflict with his/her "world of science." The teacher safely assumes that assimilation of the scientific language "animal" is an easy process where as an average child has neither the training, nor the experience, nor perhaps the interest to learn the language "animal" with its formal connotation We call this mismatch between the teacher's connotative frame (Ff) and that of the learner (Cc), "connotative relativity" The spirit of the Sapir-Whorf hypothesis (Sapir 1956; Whorf 1956) in its "weaker" form is somewhat similar to this principle of connotative relativity.

Review of Some Earlier Works

Using the interview-about-instances approach Bell (1981) investigated new Zealand pupils' (9-15 year olds) ideas about "animal." He observed that the reasons for categorising something as an animal was based on such considerations as the number of legs (animals are expected to have four), size (animals are big), and noise production (animals make a noise). Works on the same word have also been reported by Bell and Barker (1982), Villalbi and Lucas (1991). Even when some student gives the correct answer, the reason given for it may not be correct so that it can be grouped under the variety—"Wrong reason—Correct answer." This discussion, given below, as reported by Bell and Freyberg (1985) highlights this point.

Teacher : Is a person an animal?
Class : No. (Chorus)
Jane : Yes it is.
Class : No it is not.
Jane : Yes it is. We are all animals.
Teacher : Why do you say that, Jane?
Jane : Well, we are all Kiwis, aren't we?

(Jane is a New Zealand student of 8 year old. It may be noted that New Zealanders are sometimes known as Kiwis, after a flightless bird unique to that country)

This conversation also highlights the importance of the modified role of the teacher as an experimenter and a researcher in the context of science teaching

Happs (1982, 1984) reports views held by 11-17 year olds about "rock." He observed that pupils classification criteria about rocks were based on just those which scientists would generally consider to be irrelevant—weight, colour, size and jaggedness. Similarly pupils have been observed to have (Bell and Barker 1982) connotations about the words "producer" and "consumer" which are much different from those of the biologists. Stead (1980) investigated pupils' meanings about the word "living" and observed that their connotations have more correspondence with everyday language than with scientific language. Perry (1992) reported that pupils are of the view that those which do not grow cannot be living. Barman and Mayer (1994) analysed a wide variety of terms involving food chains and food webs in the framework of students' concept and textbook presentations.

In the present investigation we try to study about connotative relativity as a genesis of manifest alternative conceptions with regards to the words, "living," "animal" and "plant."

METHODS

Subjects

Keeping in view the fact that the terms "living," "animal" and "plant" are taught under environmental studies in classes IV and V, it was decided to take pupils of classes VI and VII as our subjects Because, it was expected that by that time fairly stable states of conceptualisations of the above concept labels must have been ingrained in the minds of the pupils and these will be reflected in their responses. As regards taking pupils of two classes as subjects it was thought that this variation of subjects may indicate any desirable modification that may have been effected in the internal structures of the conceptualisations over the school years. We are conscious that the actual design to investigate the above effect would be a longitudinal study of the same group of pupils over the school years. But we assume that since the selection of the pupils of each class was fairly unbiased, the group behaviour of the responses given by the pupils of the class VII will not be much different from those of the pupils of class VI when they would be in class VII.

Utilising an opportunity that came up in one of the orientation programmes held in the R I.E., Bhubaneswar, 30 tribal teachers of the primary level also became subjects for this investigation.

The details of the subjects are presented in Table 1.

TABLE 1
Details of Subjects

Name of the Institutions	*Subjects*		
	Class-VI (Age group 11-12 years)	*Class-VII (Age group 12-13 years)*	*Teachers*
	P1	P2	T1
K.V-I, Bhubaneswar	57	42	—
D.M. School, Bhubaneswar	42	44	—
D.A.V School, Bhubaneswar	45	43	—
Girls' High School, Durgapur	78	87	—
Tribal School Teachers (Primary Level)	—	—	30
Total	222	216	30

Only English medium schools were selected for this study so that the task may be set in English and linguistic irrelevancies (Vernon 1969) are reduced to a tolerably minimum level. As can be seen, a girls' high school was also chosen so that any differences, arising out of gender as a variable, will in all probability, be averaged out

The Tool

Before the tool was designed, a personal interview of 30 pupils of class VI, randomly selected from K.V-II, Bhubaneswar, was undertaken to obtain a picture of their conceptualisations about the concept labels "living," "animal" and "plant" Using their responses to the guided questions as our reference framework, the pencil-on-paper test was designed. The test consisted of 22 items, out of which, each of the first three itmes carried a list of objects, set to test the pupils' choice of objects which can be grouped under either "animal," or "plant," or "living"

Out of the rest, 16 items, consisting of simple questions, involving life-centred examples, or instances, were set with the following aim in view.

- To cross-check the choice of objects by the pupils under the first three questions exemplifying the three concept labels.
- To peep into the reasons for which a given choice was made by these insipient scientists.

To have a further check on the responses for which a given choice was made, three open-ended questions were also included in the tool, which is presented below:

Q 1· Names of six objects are given below From amongst them.pick the object/objects which you consider as animal/animals and put a tick (✓) mark in the box/es (☐), provided against those objects

(a) Cow ☐
(b) Spider ☐
(c) Snake ☐
(d) Girls ☐
(e) Butterfly ☐
(f) Prawn ☐

Q. 2. Names of six objects are given below. From amongst them pick the object/objects which you consider as plant/plants and put a tick (✓) mark in the box/es (☐), provided against those objects.

(a) Seed ☐
(b) Banyan tree ☐
(c) Grass ☐
(d) Carrot ☐
(e) Cauli-flower ☐
(f) Touch-me-not ☐

Q 3 Names of six objects are given below. From amongst them pick the object/objects which you consider as "living" and put a tick (✓) mark in the box/es (☐) provided against those objects.

(a) Snake ☐
(b) Fire ☐
(c) Money plant ☐
(d) Log of wood ☐
(e) Cloud ☐
(f) Ostrich egg ☐

Q. 4. What is the name of your best friend in your class?
Answers·

Q. 5: Is your best friend an animal? YES/NO
Explain your answer

Q. 6: Is your father an animal? YES/NO
Explain your answer.

Q. 7. Is your class teacher an animal? YES/NO
Explain your answer:

Q. 8: Is house-fly an animal? YES/NO
Explain your answer:

Q. 9: Is earth worm an animal? YES/NO
Explain your answer

Q. 10: Write the name of five animals:

(a) ____________ (b) ____________

(c) ____________ (d) ____________

(e) ____________

Q. 11: Is grass a plant ? YES/NO
Explain your answer.

Q. 12: Is creeper a plant? YES/NO
Explain your answer:

Q. 13: Is moss a plant? YES/NO
Explain your answer.

Q. 14. Is mushroom a plant? YES/No.
Explain your answer:

Q. 15: Write the name of five plants :

(a) ____________ (b) ____________

(c) ____________ (d) ____________

(e) ____________

Q. 16. Is gram seed a living thing? YES/NO
Explain your answer:

Q 17. Is fire a living thing? YES/NO
Explain your answer.

Q. 18 Is the rose flower in a rose plant a living thing? YES/NO

Q 19 Is cloud a living thing? YES/NO
Explain your answer:

Q 20 Is "robot" a living thing? YES/NO
Explain your answer

Q. 21 Is motor car a living thing? YES/NO
Explain your answer

Q. 22 Write the names of five living things.

(a) ____________ (b) ____________

(c) ____________ (d) ____________

(e) ____________

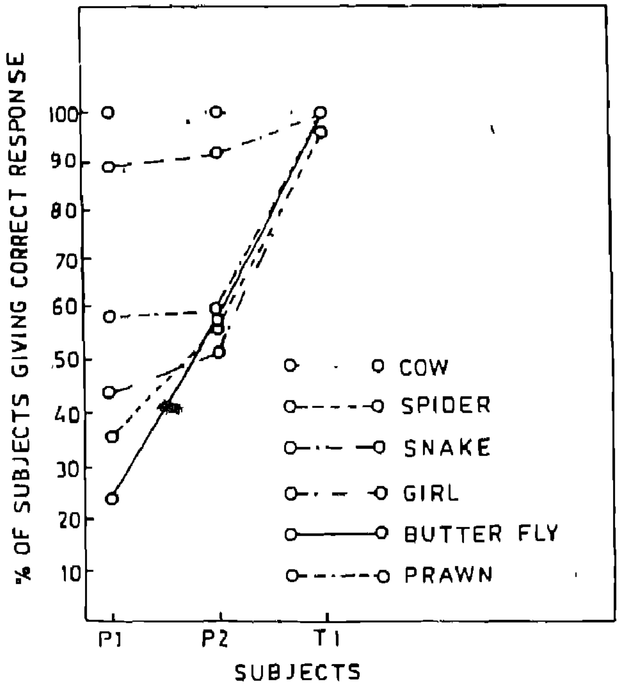

Figure 1 Response to tick the animal/s (Question 1)

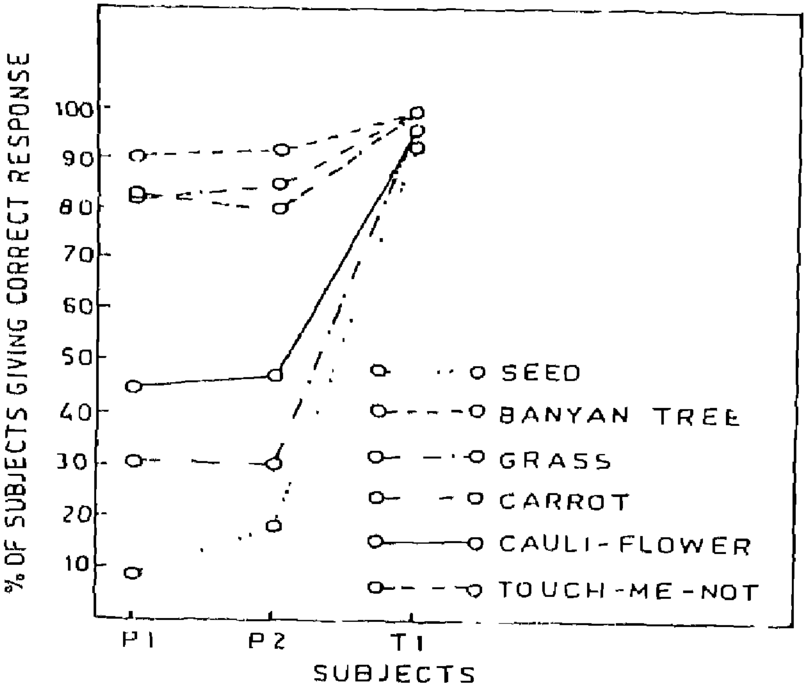

Figure 2. Response to tick the plant/s (Question 2)

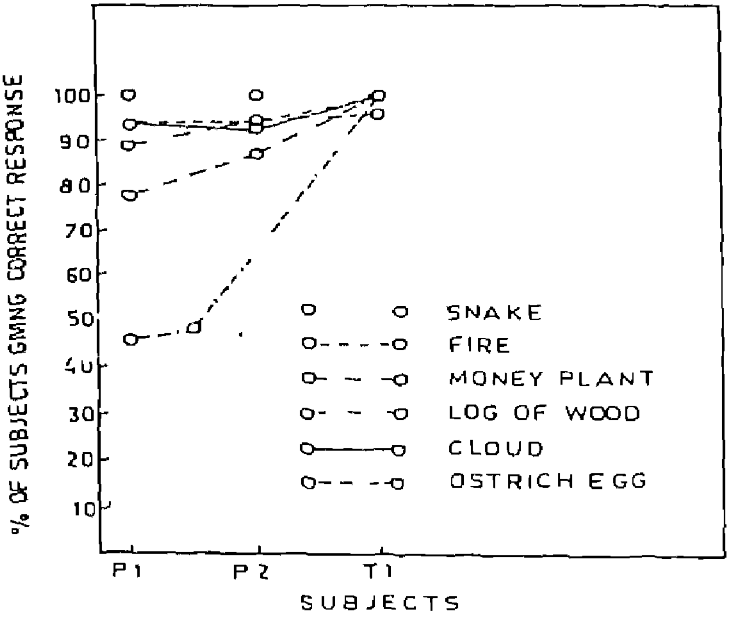

Figure 3. Response to tick the living object/s (Question 3)

Administration

In the first trial administration, the draft tool was used with the aim to ascertain any linguistic difficulties the pupils might face in comprehending the question This step was necessary for the following reasons.

- The subjects were delicate young kids (class VI & VII) who are likely to have limited exposure to *general* linguistic experiences in and outside the classroom.
- Because of the above if connotative relativity comes into operation into the language part of the question and not the concept label only, then it will, in all probability, create undesirable noises in the responses in the sense that the responses may not faithfully reflect the comprehension-background of the pupils about any specific concept label.

Analysing the responses to the items as well as the remarks in the follow up item-specific group discussions, the language part of the questions was suitably modified so that there is no disparity between what each question is expected to convey to the pupils and what each question actually conveys.

From the trial administration (second) of the finalised tool it was observed that the pupils took about 30 minutes to answer all the questions. Thus the tool was finally administered in a classroom situation and in the presence of their class teacher so that a tension-free climate is set up This was essential because, the subject being very young kids, the presence of a stranger and administering a test may create unnecessary tension which may adversely affect their responses

The administration of the tool was followed by sample, structuring discussion with pupils giving specific responses to questions

The teachers were allowed only 25 minutes to complete the test

RESULTS AND DISCUSSION

Percentage of each group of subjects giving the correct response to any particular question is presented in Tables 2, 3, 4, 5 and 6

As discussed earlier, connotative relativity may manifest due to Cc, Cf and Fc, to be contrasted with Ff.

From the above data the following conclusions follow.

(a) The most important and pervasive contributing factor for connotative relativity is the dimension of Cc. If we analyse the questions 1(a), 2(b), 3(a), then the correct responses are ensconced within the frame "Concrete concept shaped within Concrete language" and so resonate with the personal constructs of the pupils This is reflected in the very high percentage

TABLE 2

Per Cent of Each Group of Subjects Giving Correct Response to Specific Questions

Sl. No	Subjects	Questions																	
		1						2						3					
		(a)	(b)	(c)	(d)	(e)	(f)	(a)	(b)	(c)	(d)	(e)	(f)	(a)	(b)	(c)	(d)	(e)	(f)
1	P1	100	36.1	89.0	43.7	24.3	58.4	9.0	90.8	82.4	31.2	45.1	83.3	100	94.3	78.4	89.5	94.4	45.8
2	P2	100	56.6	92.3	51.4	57.2	59.0	18.5	92.0	85.4	30.6	47.4	80.3	100	94.2	87.8	95.9	93.0	47.9
3	T1	100	96.6	100	96.6	100	100	93.3	100	100	96.6	96.6	100	100	100	100	96.6	100	100

TABLE 3

Per Cent of Each Group of Subjects Giving Correct Response to Specific Questions

Sl No	Subjects	Questions														
		5	6	7	8	9	11	12	13	14	16	17	18	19	20	21
1	P1	25.4	24.2	24.8	36.1	51.3	85.4	80.9	57.8	53.7	52.7	90.0	74.3	90.9	84.8	93.8
2	P2	47.2	46.5	47.2	49.1	55.5	80.1	89.5	73.6	75.7	67.6	93.7	79.7	90.2	88.9	95.6
3	T1	90.0	90.0	90.0	96.6	96.6	96.6	100	93.3	93.3	100	100	96.6	100	100	100

TABLE 4

Per cent of Specific Names as Examples of "Animals" Given by Each Group of Subjects in Response to Question No 10

Sl No.	*Specific examples of animals*	*Subjects*		
		P1	*P2*	*T1*
1.	Big animal with four legs (like cow, dog, elephant, etc)	97 7	89 3	99 3
2	Small animals (like ant, mosquito, etc.)	0 0	7 9	0 0
3	Birds (like crow, eagle, peacock , etc)	1 6	1 6	0.7
4	Reptiles (like snake, lizard, etc)	0 7	1.0	0 0
5	Man, woman, boy, girl, etc	0 0	0.0	0 0

TABLE 5

Per cent of Specific Names as Examples of "Plants" Given by Each Group of Subjects in Response to Question No. 15

Sl No	*Specific examples of plants*	*Subjects*		
		P1	*P2*	*T1*
1	Big plants (like banyan tree, mango tree, etc)	95.8	83 2	95 2
2.	Small Plants (like grass, moss, etc)	3 4	1 1	2 1
3	Creepers (like money plant, etc. In this variety we have also included small flowering plants like rose plant etc)	0.8	15 7	2 7

TABLE 6

Per cent of Specific Names as Examples of "Living" Things Given by Each Group of Subjects in Response to Question No. 22

Sl. No	*Specific examples of living things*	*Subjects*		
		P1	*P2*	*T1*
1	Animals (including man)	48 2	42 2	87 2
2	Plants	50 3	56.8	12.1
3.	Non-living objects	1 5	1 0	0 7

of each group of subjects giving the correct response This is further corroborated by the response No. 1 to questions 10 and 15. Similarly if we combine the responses no. 1 and 2 to the question 22, it is seen that the responses are again predominantly influenced by Cc.

(b) Whenever the "Concrete concept" is not shaped within "Concrete language" and it has a mismatch with the "Formal language," then the pupils are likely to be placed in a state of confusion resulting in manifest alternative conceptions. This is indicated by the low percentage of correct responses by the pupils to the question 1(b), 1(d), 1(e) and 1(f). However, teachers are not affected by this.

(c) In this context it is worthwhile to consider the responses to question No. 3 (d). In the Co framework, obviously, the concept of "tree" as a "plant" and hence a "living" thing is likely to be deeply ingrained in the minds of the pupils. By "conceptual extrapolation" (Mohapatra and Bhattacharya 1989) they then strongly feel that "log of wood" is a "living" thing and about 10 per cent of the pupils give this response.

(d) Similarly, pupils find that their Cc is in conflict with "grass" as a plant and around 15 per cent do not consider "grass" to be a plant. This effect gets accentuated when the pupils are asked whether "moss" and "mushroom" are plants. Around 50 per cent of the pupils of class VI respond that they are not plants. The situation becomes a little better as we go Class VII indicating a perceptible modification of this alternative conception with school years. We present below the text of the discussion with one of the pupils of class VI regarding whether "moss" is a plant or not.

Interviewer : You have given a cross mark in the box against "moss" What actually you mean?
Pupil : Sir! I mean–"moss" is not a plant.
Interviewer : Why do you say so?
Pupil : It has to be so?
Interviewer : But why? There has to be some reason.
Pupil : (thinks a little) Yes . . . Sir! You see .... "moss" is not like a mango tree (*)
Interviewer : So?
Pupil : It does not have branches. It is ... so small .... (*)
Interviewer : So?
Pupil : So it cannot be a plant.

The asterisked statements show the effect of Cc.

(e) The effect of Cc generating responses which are treated as alternative conceptions is also observed with regards to responses to question nos. 8 and 9. 50 to 60 per cent of the pupils are of opinion that "house fly" and "earth worm" are not animals. Because of similar reasons almost 75 per cent of the pupils of class VI indicate that "father," "teacher," "best friend" are not "animals." The situation improves marginally when we go over to pupils of class VII. The obvious reason for such conceptualisation as contrasted with the formal concept is that human beings are never referred as "animals" in a societal context. The effect of society and environment on the process of "meaning making" of concept labels is emphasised in the societal constructivist perspectives by Glasson and Lalik (1992), O'Loughlin (1992) and Ernest (1993).

(f) The effect of Cc, "Concrete concept shaped within Formal language" can be seen in the responses to the questions 3(b), 19, 20, 21. About 6 per cent of the pupils feel that "fire" is a "living thing," about 10 per cent are having the same opinion about "cloud," 15 per cent about "robot" and 6 per cent about "motor car." The discussion with the pupils indicated their scientist-like reason-based thought process, as proposed by Driver (1983).

(g) In question no. 10, the subjects were asked to name some animals The term "animal," as taught in the class, is a "formal concept," but is cocooned within the "concrete language" "animal" generated through societal influences. As such the first names as examples of animals that come to the minds of the subjects and get expressed as responses are those which are tinted within the "concrete language." As a result of this very low percentage of names of small animals, birds and reptiles were given as examples by the pupils as well as the teachers. The situation is not better in the case of question no 15 asking for names as examples of "plant "

(h) Table 6 gives a peculiar observation in the sense that about 1 per cent of the names of objects as examples of "living thing," given by the pupils and the teachers, were names of non-living things. The reasons were more or less of the type given by the pupils in the context of "log of wood" and "fire."

(h) Table 6 gives a peculiar observation in the sense that about 1 per cent of the names of objects as examples of "living thing," given by the pupils and the teachers, were names of non-living things. The reasons were more or less of the type given by the pupils in the context of "log of wood" and "fire "

(i) The percentage of each group of subjects giving correct responses to question nos. 1, 2 and 3 are plotted in figures 1, 2 and 3. The figures indicate:

- the effect of connotative relativity as a genesis of alternative conceptions,
- the marginal desirable changes in the alternative conceptions with school years,
- the alternative conceptions which some of the teachers still posses, and
- that alternative conceptions offer resistance to any modification or change.

CONCLUSION

As hypothesised, we have been able to demonstrate, at least in the framework of the three concept labels, "animals," "plant," and "living thing," that many of the pupils' alternative conceptions are generated by the process of connotative relativity. In fact our study clearly shows that in the world of connotations of scientific terms, every child is a virtual stranger sitting in a uniquely defined cognition-tight compartment of his/her connotative relativity. We have also been able to demonstrate that the alternative conceptions, generated out of connotative relativity, offer resistance to modification, perhaps because of its deep rooted reinforcement over years If special effort is not made to take note of this and suitably modify the domain of connotative relativity, then in all likelihood meaningful learning of science concepts may not occur

In the framework of "research for teaching" and "teaching for research" we propose the following strategies to induce desirable changes in the alternative conceptions, generated due to connotative relativity.

- Those concept labels in the formal science text-book to which a child might have been exposed in his/her societal environment may be identified.
- The alternative conceptions of the child in these concept areas be diagnosed by using suitable techniques.
- A pattern in these alternative conceptions be searched in the context of the classroom.
- Innovative, process-based demonstrations/activities be designed to help the child himself/herself realise the limitations of his/her personal concepts
- Trial use of the formal concepts be suggested as an alternative to his/her personal concepts.
- Help him/her to realise the utility of the formal concept and internalise it.

Some of the questions to which answers may be sought through further research are the following.

- Are the alternative conceptions arising out of connotative relativity culture independent?
- What are the other concepts where connotative relativity is perhaps operative?

Then one may also try to develop teacher's resource material which takes into account the connotative relativity of the child. One may then make a study of the impact of the use of these materials on the meaningful learning by the child.

We are thankful to the pupils and the teacher for their excellent cooperation

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Activity-based Teaching of Concepts Associated with Means of Transport and Communication

J.P. Singh

The study highlights the need for activity-based teaching to make the teaching learning more joyful and child-centred. Eight concepts associated with the teaching of transport and communication were taken up Some tried out activities for teachers in regard to each concept were presented along with the example of the kinds of questions which could be posed to students while transacting and the assignments, particularly the home assignments, which could be given to students

It was found that activity-based teaching involve the knowledge of both content and pedagogy in terms of identification of concepts, development of appropriate activities for transaction, visualisation of learning situation, observation and continuous evaluation of the learning processes. It also brought home the point that an activity-based teaching involves a variety of teaching strategies and learning experiences like asking questions, drawing conclusions, inferring, comprising, observing, compiling information, using different resources, thus making the learning joyful.

In order to attract all children to school for universalisation of elementary education and to retain them for at least up to grade V, our teaching has to be lively, interesting and activity based The days of the teacher dominated teaching are over; its weaknesses are known to all In order to make learning joyful, the education must be child-centred, associated with activities and learning experiences. It should be practical, capable of creating new knowledge and better understanding of the problems. Identification of concepts is one task, joyful teaching with activities is another, and proper and continuous evaluation of the students is the third important task which a teacher has to perform. These activities have been tried on the teaching of "Means of Transport and Communication "

THE CONTENT

In search of a vocation man has always been moving from one place to another. His movement in recent years, however, has become rapid and complex. It is controlled by a variety of factors—physical, institutional and cultural. Besides his own movement, man helps in moving a variety of things—food, raw materials and consumable goods, ideas packed in books, letters and telegrams, and energy in the form of coal, petroleum and electricity. The movement of these goods involve carriers, routes and terminals. As mosquitoes, fleas and rats carry diseases, carts, automobiles, buses, aeroplanes, trains, boats and ships are carriers of people and goods. As sound waves carry speech and ideas and radio waves and electric impulses carry news, books, newspapers, and letters carry information, migrants and salesmen spread culture, information and facts from one area to another Routes are the media through which carriers move As veins and arteries are the routes for the circulation of blood in the body, roads, railways, airways and waterways are the routes for the movement of people, goods and ideas The terminals of the routes are the contact places, between two or more routes Railway stations, bus stands, airports, sea ports, bookstalls, post offices, telegraph offices, radio stations, and television centres are the terminal points from where goods and ideas ultimately reach the people

The operation of the means of transport and communication has helped people to broaden their outlook and mobility. The means of transport has helped the country in collection of raw materials for production of goods between different areas. The modern means of transport have greatly reduced the physical distances between places. The developed means of communication have helped in the reduction of mental distance. Now, we express distances in terms of hours and feel close so long as we get information. News and ideas are communicated in practically no time between one corner of the world and another

MAJOR CONCEPTS

1 Roads are the most common means of transport.
2. Trains have increased the mobility of people and have helped in economic development of India.
3. Aeroplanes are the fast means of transport and work well where surface means fail to operate.
4 Waterways are the cheapest means of transport.
5. The post and telegraph offices are the terminals for short and quick communication of ideas.
6. Radios and televisions carry ideas and news very fast.
7. Books and newspapers carry ideas in written form.

8. The means of transport and communication have brought different parts of the world together.

ACTIVITIES FOR VARIOUS CONCEPTS

Concept 1 Roads are the most common means of transport

In order to teach this concept hold a discussion on the importance of roads in our day-to-day life You may ask these question to initiate it. How do you come to school? How does your father or mother go to office, factory, or farm? Is your house situated away from the road? If so, what kind of problems do you face in reaching your house? If your village has an unmetalled road, what problems do you face in rainy season? Summarise the usefulness of roads in the present day life of people

Take your students outside the class to observe roads with different widths and surface conditions. Ask them to record the observations on the following lines·

(a) road types based on width—narrow, medium and wide,
(b) road types based on surface conditions—metalled, unmetalled and gravelled;
(c) road names based on their links—village roads, city roads, state highways, national highways.

Discuss the details of these roads and their importance in transport of goods and people from one place to another Draw sketches of various kinds of roads of your locality and ask your students to identify their types. Also ask them to write terminals (endpoints—places connected by the roads)

Ask the students to read the following national highways on the Road Map of India.

National Highway No.	*Description with distance*
1	Connects New Delhi, Ambala, Jalandhar and Amritsar and proceeds to the border between India and Pakistan—469 km.
2	Connects New Delhi, Mathura, Kanpur, Allahabad, Varanasi, Mohania, Barhi and Calcutta—1498 Km.
3	Connects Agra, Gwalior, Shivpuri, Indore, Dhulia, Nasik, Thane and Mumbai—1122 Km.
4.	Connects Thane, Pune, Belgaum, Hubli, Bangalore, Ranipet and Madrass—1242 km.
5	Connects Cuttack, Bhubaneshwar, Visakhapatnam, Vijayawada and Madras—1541 km
6.	Connects Delhi, Jaipur, Ajmer, Udaipur, Ahmedabad, Vadodara and Mumbai—1455 km
9.	Connects Pune, Solapur, Hyderabad nad Vijayawada—795 km

To highlight the importance of national highways, ask the following questions:

Do the national Highways connect places within the states only? How are national highways important to national integration? How are they different from other roads—state highways, city roads, village roads, etc. Who is in-charge of their construction and maintenance?

Ask your students to collect information regarding speed of the following carriers and rank them according to the rate of movement (Help them wherever need arises, with proper explanations):

Carriers	*Speed per hour (Rate of movement)*	*Rank (from fastest to slowest)*
Man		
Ox		
Horse		
Elephant		
Donkey		
Cart (Bullock)		
Bicycle		
Scooter		
Truck		
Car		

Ask them to write where these carriers are in use. You may ask them to prepare a table for this purpose.

Concept 2: Trains have increased the mobility of people and have helped in economic development of India

Introduce this concept with a discussion on trains, their movement and people involved. Where the students have not seen trains, illustrations may be used.

Compare between the transport of people and goods by railways and those by roads Trains carry more people and goods than trucks and buses do. Give them an idea about the number of people carried by trains and by buses. Have similar exercises on transport of goods.

Tell experiences of your journey by trains or ask some of your students to narrate their experience, if any. How do they sit side by side, talk with each other, and eat at the same place? What kind of dresses do people wear? How do you feel if you look outside from the windows? Discuss how all the people have the same destination, almost identical to the destination of a nation.

Discuss the importance of railways in India's development—in agriculture, in industry and in transport of people. Take examples from your own areas. How are various kinds of minerals and raw materials assembled? How are finished products distributed to different places for consumption? How are fertilisers, grains, fibres, etc., transported from one place to another by trains? Examine the importance of railways in keeping the nations together both at the time of war and at the time of peace. The railways transport not only goods but also culture and ideas. How do armed forces move at the time of war and how do trains help to reduce misery of the drought affected people? What should be our duty towards keeping such an important carrier functional? How should we protect them from damage by anti-social elements?

Explain various kinds of trains: goods trains, passenger trains, mail trains, superfast trains, deluxe trains, etc. Give them information about their speed and facilities they provide Compare trains with buses.

With the help of photographs or films show your students how trains run in plains, hills and in mountain tracts. How do they appear from a height? How do they pass through tunnels and over the bridges?

Ask your students to read the rail-route of the following trains :

(1) Himsagar Express—from Jammu to Kanyakumari.
(2) Gitanjali Express—from Mumbai to Howrah.
(3) Brahmaputra Mail—from New Delhi to Tinsukia.

Ask them to note some major railway stations on each of the routes, with states of their location. Give them information about their lengths and the hours they take to cover the destination.

Tell them to observe carefully the railway map of India. Afterwards ask them to answer the following questions.

(1) Which part of the country has a large number of railway lines?
(2) Where do you find less number of railways?
(3) Which part of the country do not have railway lines?

Help them to answer these questions.

Concept 3 Aeroplanes are the fast means of transport and work well where surface means fail to operate

To teach this concept you narrate the story of travel by air, or some students talk about their experiences. This should focus, among others, the following :

1. Travel from residence to airport.
2. Reporting time at the airport.
3. Take off of the plane.
4. Appearance of the ground below from different heights.
5. Time taken in reaching the destination.
6. Air fare.

Ask your students to compare aeroplanes with trains and buses on the following lines.

Carriers	*Number of peoples carried*	*Facilities available*	*Speed Km/hr*	*Fare Rs. /500 km*
Buses				
Trains				
Aeroplanes				

Also ask them to answer the following questions.

Which of the three above is the fastest means of transport? Why do aeroplanes fly very fast? Why can not everybody afford to travel by air? What is the difference between an airport and a railway station?

Hang on the wall a large size map of India showing airways. Ask your students to read it carefully and answer the following questions:

1 What are the main airports of India?
2. If you are flying from Delhi to Madras, at what other places may your plane land?
3. What are the places where the plane will land, if you are flying between Mumbai and Calcutta and between Delhi and Calcutta?

Discuss how aeroplanes work well where railways and roads fail to operate.Take examples from the Himalayan states—Jammu and Kashmir, and Arunachal Pradesh. Describe the utility of helicopters in these areas and the use of aeroplanes in the country at the time of war

Concept 4 Waterways are the cheapest means of transport

Draw a sketch (Figure 1) as given below and create a learning situation in the following manner The state government has organised a sports meet at Rasulpur. You all have been invited to participate How will you go to Rasulpur? Will the bus journey be convenient? How will you cross the river?

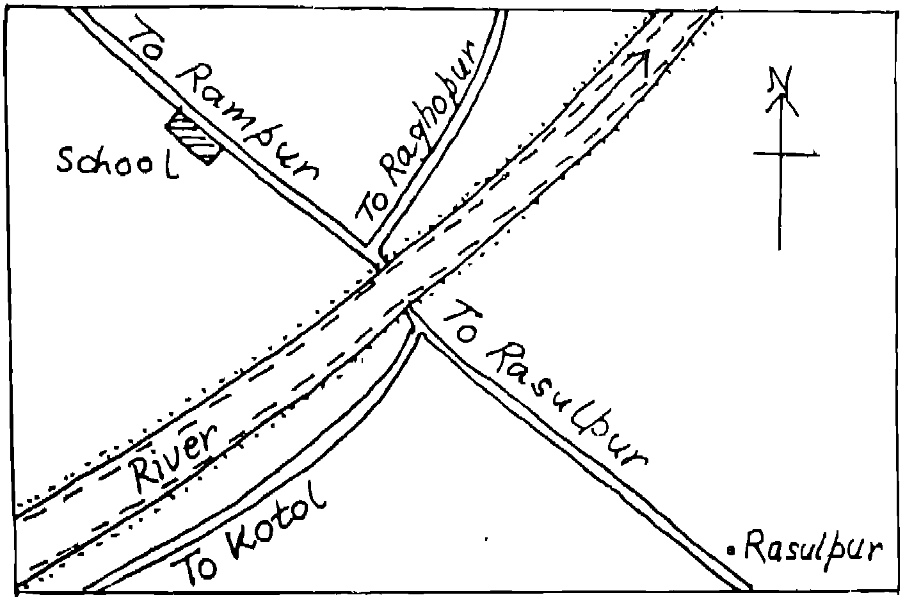

Figure 1 Location of Rasulpur and the school

Discuss different means of transport that sail on water—boats, ships, etc Ask your students to collect information from various sources and write them in tabular form.

Carriers	*Medium*	*Cost of transport Rs./ 100 km (per person)*	*Speed Km/hr.*
Buses	Land	Rs. 25 00	40 Km
Trains			
Aeroplanes			
Boats			
Ships			

Also ask them to answer the following questions·

What is the difference between a boat and a ship? Which will sail faster if the wind is slow? Which will carry more goods and people? Discuss how waterways are cheaper than roadways, railways and airways

Hold a discussion of the students on minimum depth of water required for sailing of ship and boats and nature of water bodies

Direct them to observe major rivers of north and south India in a map Ask them to examine their characteristics with reference to their flow and courses. Ask them to answer the following questions:

Which part of the Ganga river is navigable? Why are the rivers of north India navigable throughout the year? Why are the rivers of peninsular India not navigable round the year?

Explain the meaning of coastal shipping and show them important places on a map of India from where ships sail to other places. Explain the meaning of sea ports, and show them the location of major ports on a map of India. Ask them to write names of major sea ports along with the states of their location.

Concept 5· The post and telegraph offices are the terminals for short and quick communication of ideas

To teach this concept show your students a letter or a post card received from someone and discuss about its concept and sender's address. Inquire whether they also write letters to their relatives or friends and receive replies from them. Who brings letters to your house? Where do you buy inland letter cards? Where do you post your letters? How much time does your friend's letter take to reach you?

Take your students to a nearby post office and show them its functioning Buy post cards, inland letter cards, envelopes, money order forms, etc., and allow each student to see them carefully. Introduce them to the post master, postal clerk and post-man.

In the classroom ask them to complete the table given below:

Articles	*Size in cm (Length and breadth)*	*Price for one*
Post card		
Inland letter card		
Envelope		
Money order form		

Discuss how to write letters, addresses on them and how to fill in the money order forms Demonstrate these activities, and ask them to do the same.

Explain the meaning of postal index number (PIN) and its advantages. Given them an idea about postal zones of India.

Discuss the importance of telegrams and telephones in our life today. How much time do they take to reach the persons concerned? Show them on the blackboard the method of filling a telegram. If possible take them to a telegraph office, and show them how message is sent and received.

Ask your students to talk on telephones. Demonstrate the technique of dialing/connecting a number. Ask them to answer the following questions.

1. Some one in your home is sick. You need a doctor to see the patient immediately. What will you do? Will you write a letter, or send a telegram or contact him on telephone? Give reasons
2. Your friend living at a distant place wants to know the description of the places you visited recently.
3. Describe briefly how your letter reaches your friend living at a distant place.

Discuss with them what the STD/NSD and ISD are. What is PCO?

Concept 6· Radios/transistors and televisions carry ideas and news very fast

Switch on a radio/transistor before the students and ask the following questions :

Where are you listening to in the radio/transistor? Where is the programme being performed? How many people are listening to the programme? Can you talk to the person who is giving the programme?

Discuss how a radio/transistor functions and communicates with others without any visible link. The link is one-sided like a loud-speaker. You can hear it but you cannot react to it. It is a means to communicate ideas very fast and with a large number of people. Also discuss the various programmes broadcast from All India Radio and the distribution of radio stations in the country

Many students might have not yet seen television Show them a model of it. You can prepare the model with a carton and a set of printed posters/pictures.

Explain how a television works and discuss the programmes telecast. Give them some idea about the distribution of television relay centres in the country and also about various channels. Put the following questions to your students·

1 What is the difference between a radio and a television?

2. How are the two similar?
3. Which of the two comunicate ideas better and how?
4. Which of the two is more handy and why?

Concept 7: Books and newspapers carry ideas in written form

Since all the students read books and many of them even newspapers, this concept may be taught by asking questions. Why do you read books? What kind of information do you get in them? What is the difference between a newspaper and a book?

Discuss other aspects of books and newspapers and some interesting items of newspapers Give them a brief historical account of newspaper publishing in India.

Now ask them the following questions·

1. What is the difference between a book and a radio?
2. Which of the two you like more and why?
3. Which one you consider more useful in your study?

Discuss how a photostat machine work and how a fax machine sends written information from one place to another. Also discuss their usefulness in modern life. If it is possible take them to a place where these are available

Concept 8. The means of transport and communication have brought different parts of the world together

Collect information about permanent homes of students and compile them in the following manner·

	Name of students	*District*	*State*
1	Gopal	Bhopal	M P.
2	Sunita	Meerut	U.P
3.	Ravi	Jalandhar	Punjab
4	Ismail	Akola	Maharashtra
5.	Joseph	Madras	
6.			
7			
8			

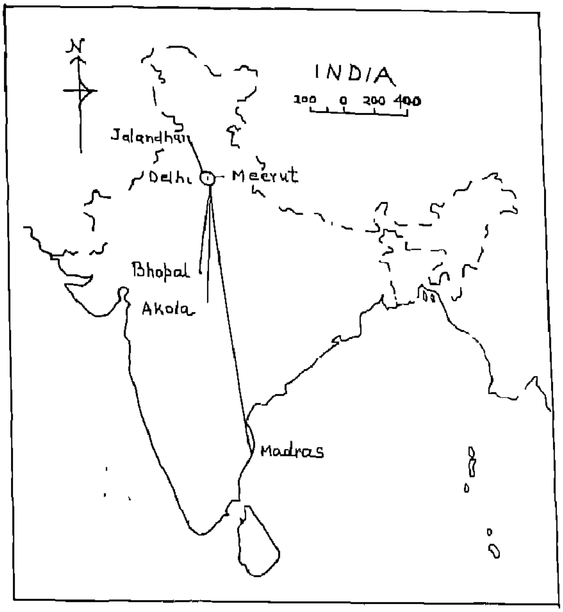

Figure 2. Permanent homes of some students of a class.

If the school is located in a village names of students and location of houses may be compiled.

Hang the table in the class room. On an outline map of India join all the districts with the place where the school is situated by straight lines. You get a ray diagram (Figure 2) which shows the permanent homes of the students of your class.

Put these questions to them:

1. How do you come from your home?
2. How do you get news from your home?
3. Had there been no roads, railways, waterways, etc, what difficulties you would have faced?
4. How much time you would have taken?
5. How do you feel when you get news or read a story about your district or state?

Ask your students to write five sentences on the "Advantages of Means of Transport and Communication," and discuss them in the class Also discuss how news from one country are flashed to the rest of the world.

HOME ASSIGNMENTS

The following activities may be given to the students to be completed individually at home:

(i) Draw a sketch of the path/road from your house to your school.
(ii) How do you come to your school: on foot, or by some other means?
(iii) Write name of the places you have travelled by railways or by road
(iv) Imagine that you are flying over your village or your locality like a bird, describe how the earth below would appear to you.
(v) How is water transport cheaper than railways and roads?
(vi) Write name of the nearest post office and the nearest telegraph office from your residence.
(vii) Where is the television relay station for your village or city located?

The students should be told that if they are unable to collect the information themselves, they may take the help of their parents or some other person in the village or locality.

CONCLUSION

A variety of methods have been used to teach the concepts Sometimes question-answer method has been followed while at other times they have been asked to read maps and draw conclusions. They have also been required to compile information in tabular forms. Comparisons, contrasts, observations, map reading, map filling, measurement taking, listening to radio, compiling information and writing letters are some of the activities which have been used and suggested Each of these helps them to learn and draw conclusions and clarify notions Use of environment and community resources has been made wherever possible. Under home assignments a variety of activities have been enlisted but none are taxing the students and their parents. These may be tried, refined and modified according to the level of students and the availability of the materials in the environment. The teachers, however, must evolve their own methodology as far as possible.

Effect of Competency-based Instruction in Achieving MLL Competencies in Grade IV in Oriya Medium Schools

S.C. Panda

The study identifies (a) the MLL related competencies from the science textbook of grade IV, prescribed by Government of Orissa, (b) identifies higher level of learning (HLL) components from the same textbook, and (c) ascertains the effect of competency based teaching in attaining MLL and HLL by the students.

Grade IV students of an Oriya medium school in the city of Bhubaneswar formed the sample for the study, with experimental group pre-test–post-test expeimental design was selected for the purpose Coloured Raven's Progressive Matrices (RPM) was used to measure intelligence percentile of each individual Also, a competency-based criterion referenced mastery teacher-made test was developed and used to measure entry behaviour and terminal behaviour of the students.

It is reported that there is remarkable difference in the achievement of both the groups because of the difference in treatment, (ii) the competency-based instruction yielded significantly better results than the traditional method of teaching, (iii) the exerimental group differed significantly at.01 level from the control group at the post-test stage, and (iv) on the whole 87 15 per cent in experimental group could score more than 60 per cent, whereas in control group only 27.75 per cent could achieve the same.

In the entire process of education, the primary stage is the most crucial one. It is the formative stage in which reading, writing, listening, learning, thinking and development of certain other skills takes place. Environment is used in an effective way for qualitative improvement of primary education where the transactional procedure plays an important role Many researches advocate that better methodology of teaching by making use of approaches like mastery learning strategy, use of multimedia, use of objective based instruction and other special plan of actions in different stages of education have supremacy over the traditional way of teaching (Spicer, 1989; Spencer 1991; Rae 1993; Kour 1995, Panda 1995). According to Subbaih (1993) the traditional method is unattractive, rigid and unsystematic. Out of children admitted into class I only 50 per cent are retained in class IV and 34 per cent in class VII It happens because, the schools are unattractive, teaching is not effective and the defective process of evaluation. There may be some other interfering variables which might be present along with methods of teaching-learning and content may not be that useful in real life situation. To overcome the problem to a greater extent better use of environment is always suggested for enhancement of retention in primary schools

The revised National Policy on Education (1992) visualises a new thrust in elementary education for improving quality of education substantially The important aspect of its emphasis is that all the students should be enabled to achieve essential levels of learning. The activity-based process of teaching and learning is one of the better means where attainment of minimum levels of learning (MLL) has been emphasised. In this technique there is ample scope for the teacher to help the student, diagnose and find solution to his academic, personal and social problems

In competency-based teaching approach the mastery of all that had been learnt or aquired in terms of skills will indirectly lead to quality education. As a teacher one has to be clear about the competency/competencies to be developed in learners. This will help one to decide suitable content, appropriate teaching methodology, suitable teaching aid, appropriate evaluation technique and necessary remedial measures for those facing learning difficulties (Ved Prakash et al 1995).

There are some important variables which are responsible for affecting students' achievement in our school system. The factors as identified by Singh et al. (1995) are student background variables and school level variables The student background variables are socio-economic status, gender gap, parents' education, parents'occupation, repeaters, caste gap, and the school level variables are teacher quality, (qualification, experience, study period in school and inservice teacher training), school resources (educational facilities, physical facilities, number of teachers, pupil-teacher ratio) and school academic climate (teacher frequently taking test and providing feedback, teacher assigning home work and correcting and frequency of this activity). Besides these variables there is some other State intervention like operation blackboard schemes, incentive schemes which is unique to a particular state also effect student achievement.

The signposts to effective teaching as identified by Alexander (1995) task, time, talk and text were inbuilt in competency-based instruction. When the condition of Oriya medium schools are considered it is found that all the variables mentioned above for better student achievement present a sorry state of affair Particularly, the school level variables are far from the level of satisfaction. Whatsoever the possible reasons may be, a large number of teachers at primary level are not properly motivated to make use of innovations in teaching in classroom set-up. There is often a resistance for any innovation from teachers in education system. The propositions of teacher resistance to innovations as mentioned by Chapman (1995) are worthy to note here. Those are· teachers do not see the problem, teachers resist innovations that increase the complexity of their work-life, proposed innovations run counter to teachers' beliefs about what constitutes effective teaching, the organisational structure of the education system in many countries works against the easy adoption of innovative practices, the innovations themselves have problems that only emerge during large scale implementation.

In this study here an attempt is made to see the effectiveness of an innovation in an Oriya medium school in the city of Bhubaneswar, i.e., in a Government U.P. School, Sector-1, IRC Village

OBJECTIVES

1. To identity the MLL related competencies from the Science textbook of grade IV prescribed by Government of Orissa
2. To identify Higher Levels of Learning (HLL) components from the same textbook
3. To ascertain the effect of competency-based teaching in attaining MLL and HLL by the students

HYPOTHESES

1. There is no significant difference at the means of attainment of MLL competencies between the experimental group and control group at the cognitive level.
2. There is no significant difference at the means of attainment of HLL components between the experimental group and control group at the cognitive level.
3. There is no significant difference at the means of attainment of summative cognitive competencies between the experimental and control groups.

METHODOLOGY

Sample

Grade IV students of an Oriya medium school in the city of Bhubaneswar were selected. Experimental group consisting of 32 students and control group of 36 students, and both the groups were matched as shown in Table 1

TABLE 1
Difference Between Experimental Group (N = 32) and Control Group (N = 36)

Test	*Group*	*Mean score*	*% of mean score*	*S D*	*'t'*	*Level of significance*
Intelligence	Experimental	19.84	5 11	5 48	0 88	ns
	Control	17 86	49.61	6.66		
Pre-test Achievement	Experimental	14 06	21.63	8.30	1 42	ns
	Control	11 81	18.17	4 46		

Design

Matched group Pre-test–post-test experimental design was selected for the purpose

Instrumentation:

1. Coloured Raven's Progressive Matrices (RPM) was used to measure intelligence percentile of each individual
2. A competency-based criterion referenced mastery teacher-made test was developed and used to measure entry behaviour and terminal behaviour of the students.

Procedure

At the outset the MLL competency no. 8 was choosen from the identified national level competencies. This competency referred to the chapter "Living World" of the Science textbook, *Ama Vijnana Patha* (1995) meant for grade IV. Basing on the expected entering behaviour of the learners as regards the MLL competencies the MLL and HLL components and competencies were identified at different cognitive levels by the help of a panel of experts.

The experimental and control groups were matched satistically based on the mean intelligence percentile score and mean achievement pre-test score Both the groups were treated separately. The control group was treated with traditional method of teaching by the subject teacher as an usual manner She was allowed to do so so as not to disrupt the traditionality of the teaching strategy to which students were familiar The experimental group was treated with competency-based teaching with properly structured activity-based lesson plans. The pre-lesson discussions and post-lesson discussions were carried out intermitently to make the teaching more effective. The chapter "Living World" was taught to both the groups, the text of which was not written based on MLL The subject teacher was kept informed about the objectives of the experiment

FINDINGS AND DISCUSSION

The MLL competency no. 8 identified at national level which was taken into consideration was as under: "The pupil develops skill in gathering and classifying information about living things from one's environment and drawing simple inferences "

The expected previous sub-competencies already acquired by the students before application of the treatment were identified as mentioned

Sub-competency no 8.3. Living things their characteristics and classification
8.3 1 Observes local surrounding and classifying things into (i) living and non-living, (ii) natural and man made
8 3.2 Understands similarities and differences between animals and plants
8 3.3 Indentifies main parts of plants
8.3.4. Classifies common plants on the basis of size, life span, and seasonality.
8.3 5. Observes food habits of different animals and birds.

Expected sub-competencies to be acquired after the lesson was learnt

Sub-competency no. 8.4 Living things- Their usefulness to man.
8.4.1. Identifies some important ways of using plants and animals
8.4 2. Examines the need of caring and protecting animals and plants
8 4 3. Visualises the roles of different parts of a typical plant.

8.4.4 Understands the process of dispersion of seed and its importance.
8.4.5 Narrates the importance of interdependance of plants and animals.

The MLL and HLL components were identified from the textbook

The post-test result available after the given treatment for testing the hypotheses is given in Table 2

The analysis of data was taken with a comparative perspective where the hypotheses of effectiveness of treatment was more confidentially tested. This was done by comparing achievement gain scores on the post-test of both the groups at MLL, HLL and summative level.

Perusal of the Table 2 revealed that there was remarkable difference in the achievement of both the groups because of the difference in treatment The competency-based instruction yielded significantly better result than the traditional method of teaching

TABLE 2

Difference Between the Experimental (N = 32) and Control Group (N = 32)

Score	*Group*	*Mean*	*S.D*		*Level of significance*
Total MLL score	Exptl.	31.64 (73 58)	6.09	7.05	0.01
	Contl.	21.13 (50 31)	6 15		
Total HLL score	Exptl.	8.89 (40 41)	3.11	4.55	0 01
	Contl.	5.68 (14.23)	2 66		
Total Post-test score	Exptl.	40.53 (62 35)	8.37	6 66	0 01
	Contl	26.81 (41.25)	8 58		
MLL gain score	Exptl.	23.05	5.36	11 08	0.01
	Contl	10 75	3.46		
HLL gain score	Exptl.	5.37	2 67	6 94	0.01
	Contl.	2.00	1.40		
Total gain score	Exptl	28.72	7 02	11 33	0 01
	Contl.	12.75	3.38		

Figures in parantheses indicate percentage.

The experimental group proved its importance by differing significantly at 0.01 level from the control group at the post-test. Even the mean gain scores differed significantly at MLL HLL and summative level thereby rejecting all the formulated hypotheses It was established then that changing of strategy could be responsible for yielding better result in classroom situation The percentages of mean achievement even in experimental group did not present a satisfactory result. It was only 73 58 per cent against that of control group which was 50 31 per cent only.

As far as the creation of masters because of the treatment was concerned the achievement level has been presented in Table 3.

TABLE 3
Achievement Level of the Learners in Experimental and Control Group

Group	*Achievement level*				
	90% and above	*80%-90%*	*70%-80%*	*60%-70%*	*Total*
Exptl.	3 (9 38)	10 (31 25)	7 (21.88)	8 (25 00)	28 (87 51)
Contl.	1 (2 77)	1 (2 77)	1 (2 77)	7 (19 44)	10 (27 75)

Figures in parantheses indicate percentage

A close look at the Table 3 revealed that in creation of high achievers the competency-based instruction was more beneficial than the traditional one If 80 per cent or more score of achievement could be considered as the criterion to be a master in the task then it was found that only 40.63 per cent in experimental group and 5 56 per cent in control group could be identified as masters. On the whole it was found that 87.51 per cent in experimental group could score more than 60 per cent whereas in control group only 27.75 per cent could achieve the same The creation of masters in control group might be the product of entering behaviour of the learners and their home environment but might not be due to the effert of teacher in particular or school in general. But in experimental group the better use of instructional strategy by the teacher might be responsible for such development According to Singh et al (1995) school level variables such as teacher quality, school resources and school academic climate are responsible for effecting student achievement besides the student background variables and other state interventions. In competency-based instruction the school level variables could be put into action in a better way than the traditional way of instruction. The sign post to effective teaching as identified by Alexander (1995) task, time, talk and text were inbuilt in competency-based instruction. School resources were better utilised here. The teacher in-charge of control group could not utilise the school level variables properly which might be responsible for low achievement of the learners though she was aware of the experiment It might be due to the proposition as mentioned by Chapman (1995) of teacher resistence to innovations as indicated earlier.

Hence it can be ascertained that the traditional method of instruction in elementary school may not be that effective as compared to competency-based instruction. The teachers in-charge of elementary education has to accept as substitute the competency-based instruction to meet the present day requirements of quality for universalisation of elementary education

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Alternatives to Reduce Stress on Preschool Children

Usha Dutta

The study reports the actual methodology practised in schools and attempts to search alternatives to reduce stress in the preschool children.

Twenty-two preschools in three districts of Rajasthan were surveyed. Based on an interview schedule prepared by the investigator, the principals/teachers of preschools were interviewed The field study also took stock of the toys used in preschools

It is reported that (i) the sample schools used/stocked wooden, plastic, paper, metallic and clay toys. These toys were either prepared by children themselves or bought from market or had been donated (ii) group songs, drama and role playing were found to be powerful approaches to reduce stress in preschoolers

It is suggested that drop-out rate in primary classes may be significantly reduced by providing in schools better facilities, better quality of teaching, by making school environment more attractive and less of book-work

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In recent years, there has been a growing recognition of the importance of Early Childhood Education The National Policy of Education has focussed on the play and activity approach instead on the formal method of teaching the 3 R's during the early stages. The Yashpal Committee has voiced concern over the academic burden on students—the pernicious burden of "noncomprehension," the load of learning with even preschool children carrying heavy bags

The NCERT has started a series of seminars through the major cities of India for raising awareness on the transaction of the early childhood education programme The Director, NCERT has sounded on the hazards of downward extension of primary curriculum and on the total development of the preschoolers

In Rajasthan, there is a high drop-out rate at primary level, particularly in classes I and II. After two successful seminars-cum-workshops at Jaipur schools where crucial questions like the ECE curriculum, raising of academic standards, nature of entrance tests to the primary school, the age of admission and related aspects were discussed, the regions of Kota, Bara, Bundi were taken up. Since the earlier seminars were pointers to bring about change in the methodology of the ECE programme from formal to a development oriented one, a field study was taken up at Kota preschools. The earlier seminar also established that the teachers working in the field of ECE have little knowledge of how children learn Only rote method is practiced, be it rhymes, stories, alphabets or numbers The joy in the ECE programme is missing.

The Kota district field study aimed at looking into the actual methodology practiced in schools and a follow up workshop to search for alternatives to reduce stress on the preschool children.

This article discusses (i) the rationale of all the alternatives; (ii) the alternative methods depicted, discussed and arrived at in the workshop, (iii) recommendations

The Need

In India although a large number of methods are on the move the initial emphasis rests on the textbook. Thought to be the most effective tool, the classroom scene is the same everywhere—the teacher teaching, the pattern of children repeating and rote methods on the increase There is thus a need for alternative methods to be used in the ECE transaction to reduce stress and to stop a large drop-out rate. In Rajasthan, the teachers and material writers have not had sufficient evidence to try out alternatives. The field studies conducted in Rajasthan established the need to look into, and demonstrate alternate strategies. Exposure and assurance of new methods helped teachers, cope with stress

WHAT DO ECE TEACHERS NEED?

- The ECE teachers need to build up a large bank of useful methods
- To practice recognising these methods when they actually see, listen or read about them.
- To gain confidence to put to use some of these methods.
- To experience a sense of achievement and progress
- To recognise that children learn best by doing.
- To have exposure to different methods.
- To put in effort for making these methods work in the interest of the child.

METHODOLOGY

A field study was conducted for the Kota, Bara and Bundi Districts of Rajasthan surveying 22 preschools. Discussions were held with the Principals/Teachers of the preschools To find out the exact methods used, an in-depth interview schedule was prepared to find out how teaching was taking place. Teachers were vague and had few notions about many other methods which could be used For example, if they agreed that toys were necessary for preschoolers their usage and proper handling of the concepts were missing out The textbooks were the main resource for them. However, they were all keen to know and practice new techniques

Use of Toys

The field study conducted in Kota took stock of the toys used in preschools. Out of a total of 22 schools, 4 schools used clay toys, 5 used metallic, 14 had paper toys, 18 used plastic toys and 14 had stocked wooden toys

Educational Toys

Toys	*No.of Schools*
Clay	4
Metallic	5
Paper	14
Plastic	18
Wooden	14
Total (n) = 22	

It was interesting to note the sources of the toys. In 10 schools these were prepared by children, 19 had market toys and 5 had donated ones

Sources of Toys

Sources	*No.of Schools*
Prepared by Children	10
Market	19
Donated	5
Total (n) = 22	

It was clear that teachers did associate toys with a preschool. Some schools had kept toys as show pieces locked in almirahs.

The teachers also thought that their job gets reduced once the children are in the world of toys and amidst toys

The follow-up workshop which had demonstrations from the rural centre, Jhalawar (Rajasthan) showed how toys contributed to the children's development in physical, social, emotional areas. The physical skills of holding of a toy and striking balances. The social skills of sharing and cooperation. The skill of speaking about the toy and listening to it can be developed. A creative approach to toys was discussed. The proper arrangement of supplying appropriate toys, the teachers need to be sensitive to observe the children with toys, rearrange and add to make learning exciting

Recommendations

The toy making competitions arranged by the NCERT for teachers could contribute in the production of relevant low cost and easily available toys Many toys could be categorised, catalogued and built for learning in the ECE programme

Music

How music and instruments were put to use in preschool was surveyed Out of a total of 22 schools in Kota, 2 practiced vocal music, 4 had instruments and 7 had both. Others (8) did not use music in class.

Type of Music	*No. of Schools*
Vocal	3
Instruments	4
Both	7
Total (n) = 14	

Workshop demonstration encouraged teachers to improvise songs, hymns chants, singing together in groups. As children play around with novel ideas, the development of thinking creatively with flexible movements, the ability to communicate is fostered

Demonstration of animal stories with instruments music and singing by music team from Vidyashram School engrossed all participants.

Teachers agreed that music would make children forget their insecurities and fears. They would be able to gain confidence and provide an enriching experience. A lot of involvement would take place, it could also become a medium of child expression Children listen to music attentively and can sing songs with rhythmic accuracy, sound and melodies.

A New Approach

Music can be made personal for the preschoolers to enjoy and to promote positive self-image The child's personal feeling, clothes, food, friends, pets, animals, toys, objects in the environment can all be taught to the accompaniment of the music Also drums, tambourines, bells, variety of school-made shakes (in boxes and bottles) containers having dals, rice, etc, striking rods, wooden or metal, for group activities can be tried out

Child listen to stories with delight Listening allows freedom to imagine, to interpret scenes as they choose Such activities are useful for reaching to persuasive and emotional language development. Listening also forms the basis for learning to speak, read and write.

Drama

Another alternate approach in teaching the preschoolers to reduce stress is drama. Dramatic play is an engaging activity for children. The children create and pretend roles for themselves. It offers a powerful outlet and thus reduces the burden of the textbooks.

The survey of Kota schools showed that the preschools in general were aware of activity and fun as part of a preschool programme.

Activities	*No of Schools*
Games and Sports	18
Nature Study Programme	14
Play Way	10
Visits Outside	15
Total (n) = 22	

Dramatic demonstrators paved the way for teachers to use drama in preschools.

The study also showed some modes of punishment prevalent

Mode of Punishment

Mode	*No of Schools*
Scolding	16
Impolite words	5
Physical	1
Total (n) = 22	

Teachers did own up that scolding was practised—16 out of 22 schools did accept this fact. Impolite words were used in 5 and physical punishment resorted to in 1.

The workshop demonstrated fun activities of role playing and simulation, thus reducing use of punishment and criticism made by teachers. Harsh words reduce a child's confidence as a learner. The teachers understood that children learn by making mistakes. Also that it is equally relevant to assist children and solve their problems rather than punishing or ridiculing them. In fact, these be replaced by praise. Praising the child's efforts were focussed in the preschool programme.

Professor Yashpal's contention of removing competitions was actually worked out in the workshop Drama was one alternative which involved the children totally with no sense of competition no 1st or 2nd—no rights or wrongs. Children were freer and expressed themselves naturally This activity need not be treated as something different but an unbuilt part of the curriculum.

It is indeed a sad comment that when children enter school they are taught to be quiet, not to move and are even punished for talking and moving. Children develop more joy and feel happy. Preschoolers can be given parts of animals, birds and have real experience with the stories They understand them well and feel excited about acting out the part. They imitate the characters and learning becomes fun. Even serious children get changed to playful ones.

Thus to reduce stress drama movements provide for an active and involved alternative.

An argument raised by some teachers is that they are not good dancers and good singers but the workshop helped them to realise that encouragement and arrangement of these activities were more important. It showed them how such an activity can be co-related with every aspect of curriculum and if presented without any stress dramatic movements can be a pointer to ECE success.

CONCLUDING RECOMMENDATIONS

Rajasthan experiences a high drop-out rate at classes I and II. Many socio-economic factors are responsible, but, poor facilities and poor quality of teaching in schools are the major contributory factors. One of the reasons is also that the schools are not attractive, with too much book work and parents tend to withdraw children if they are unhappy or the teachers fail to teach.

There is now a growing recognition of the importance of early years and ECCE being a feeder programme to primary education, it lays the ground work for healthy development. Since private nursery schools, nursery and kindergarten classes are on the increase in size and number there is need to empower teachers of preschools to foster joyful teaching-learning, for enrolment increase and also to help children attend school regularly

In this paper I have presented accounts of alternative methods on the ECE course Teachers were consulted on the motivational value of these methods—positive or negative with a view to look into these alternatives which are likely to be useful and innocuous. In the case of the use of the textbooks it was agreed to keep its use to the minimum Of course, the success of these methods rests on changing the teacher attitudes and to reflect and provide him/her with wider choices in classroom teaching.

A group of 100 teacher/principals/administrators and enthusiasts worked on the above methods. However, there is still a larger group of teachers/administrators who do not understand the objectives of the ECE programme

Current Needs

- Awareness raising workshops.
- An open and thorough discussion of these methods.
- An explicit Government statement to use these besides the text.
- To motivate teachers to develop a child friendly, joyful classroom interaction.

Assessment of the Cognitive Development Level of the Primary Stage Pupils

Madhuri Mahapatra

The study attempts to ascertain and compare the level of cognitive development of boys and girls belonging to the same chronological age with a view to finding out whether a special curriculum is needed for girls to improve their education at primary levels.

One hundred twenty-seven boys and girls, from calsses III and IV of Demonstration School, Bhubaneswar, were examined.

The Science Reasoning Task (SRT) developed by CSMS group on "Volume and Heaviness," suited to the Indian conditions, was selected to assess the level of cognitive development at five different stages and substages given by Piaget

The findings reveal that pupils of the same chronological age do not belong to the same cognitive development level. At higher level of cognitive development the percentage of boys have been found to be higher than the girls The mean scores of boys of class III and IV are higher than the girls though not significant.

INTRODUCTION

Primary education has its universal importance. Primary education in developed countries has reached 100 per cent by 1960, however this is not the case in many developing countries (Orpword & Werdelin 1987). In India, specially in Orissa according to 1991 census the rate of female literacy rate is 34.47 as compared to 62.377 for males The female literacy rate is even lower amongst rural population. In rural areas out of every 100 girls who enrol in class I only 40 remain upto class V, but the retention rate in urban areas is much higher than it, i. e., 74 per cent. The three principal reason that deny girls education in India are:

- Poverty

- Traditional belief that education is of little use to girls whose only destiny is marriage and mother hood.
- Girls are required to assume domestic and child rearing responsibilities from a very young age in order to release their mothers for remunerative work.

One of the possible reasons that deny girls education may be due to a curriculum the cognitive demand of which do not match the cognitive level of the girl child. To know this aspect the boys and girls cognitive development levels are to be compared. If any significant difference between cognitive development level of the boys and girls are noted then two methods can be adopted for improving girls education in primary level.

- Special curriculum for the girls to be developed
- Cognitive acceleration as suggested by Adey (1988, 1992) can be used to enhance the cognitive abilities of the girls

In this small project the cognitive development level of the pupils of D.M School, Bhubaneswar were ascertained and the cognitive development level of the boys and girls were compared

METHODOLOGY

Selection of Tool

The cognitive development level of the pupils using the technique of semistructured interview (i.e., the methods clinique) was suggested by Piaget and his followers. However efforts were made by Longeot (1965), Bart (1972), Rowel & Haffmann (1975), Pearson (1976) and Isaacs (1976) to minimise the limitations contained in the technique of method clinique and to take project into classroom. The CSMS (concept in secondary maths and science) group (1974) at Chelsea cottage London developed tasks, called Science Reasoning Tasks (SRT) and were examined rigorously to prove their reliability and validity In these pencil-and-paper tasks adequate care was taken to eliminate all the drawbacks faced previously by different psychologists while trying to bring Piaget into classroom Out of the seven SRTs developed by CSMS group during 1973-1978 the SRT named volume and heaviness has been chosen to ascertain the cognitive development level of the pupils of the primary classes. The rationale for choosing the task is as follows:

- The task require very simple equipment for step-wise demonstration of different items
- The reliability of STRs under India conditions has been verified by Mahapatra & Mahapatra (1990)
- It contains test items from early concrete 2B to early formal 3A level.

Selection of Samples

Pupils of class III and class IV of D M. School, Bhubaneswar which is run by NCERT were chosen as sample. The rationale for choosing this sample were as follows

- D.M. School is an English medium school.
- The admission procedure at the entry point, i.e., class, I is based on random selection by computer. Thus the sample chosen is likely to represent the total population of pupils of class III and class IV in and Ground Bhubaneswar The details of the sample is given in Table 1

TABLE 1
Statistics of Sample

Class	*No of Boys*	*No of Girls*	*Total population*
III	35	25	60
IV	43	24	67

Administration of the Task

The task as prepared by the CSMS group was administered as such without any alteration The task investigates the child's concept of size in which mass, weight, volume and density are not clearly differentiated from each other. The equipments were large enough so that these were visible to the whole class.

The equipments used were

- Glass trough, or metal tray.
- 1000 cm^3, 500^3, & 100cm^3, measuring cylinder
- Some grains of maize and some pop corns
- 1 cm^3 Wooden cubes, 17 in number.
- $(5 \times 4 \times 3)$ cm^3 Iron block.
- 2 lumps of plasticiner $(5 \times 4 \times 3)cm^3$.
- Glass box, With one face open with dimension $(10 \times 10 \times 10)$ cm^3, $(20 \times 10 \times 10)$ cm^3
- 100 cm^3& 250 cm^3 two glass beakers

A photograph of the equipments is given in Figure 1

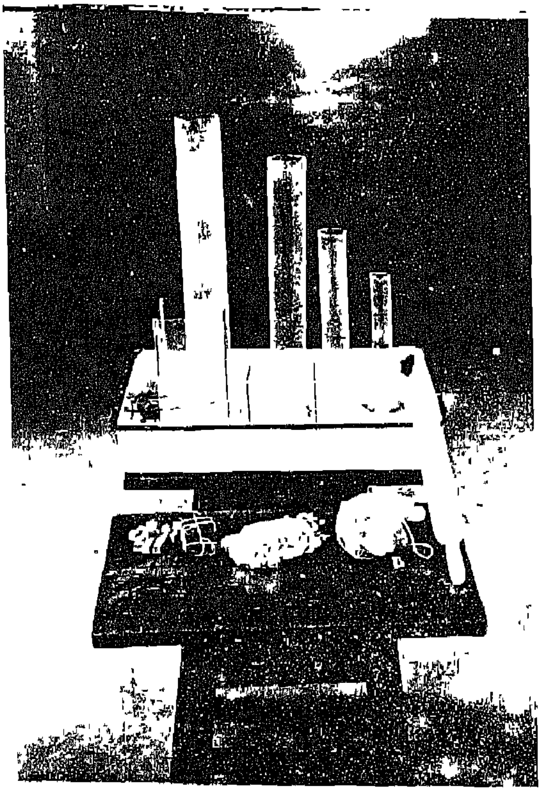

Figure 1. A photograph of the equipment

The test was administrated in the presence of the class teacher and all steps were taken to create a relaxed and slow moving situation. Time taken to administer the task was one hour Some of the pupils could not answer a single test item correctly or the answered one could not be assessed as it were not coming within the assessment rule. Thus in class III and class IV the pupils assessed are given in Table 2.

TABLE 2
Details of Pupils Assessed

Class	*Total pupils*	*Pupils assessed*	*Assessed Boys*	*Assessed Girls*
III	60	52	32	20
IV	67	53	37	16

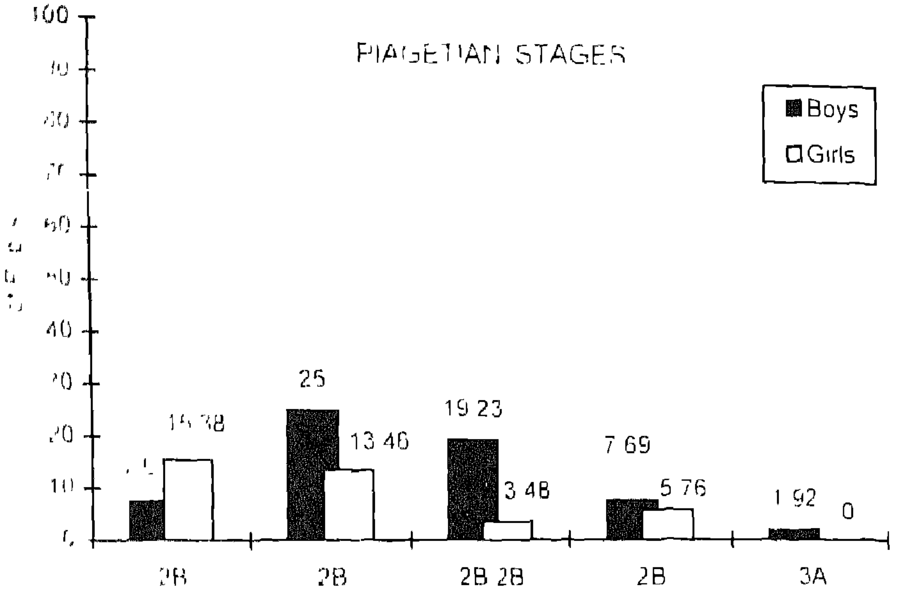

Figure 2 Distribution of pupils in various stages for class III

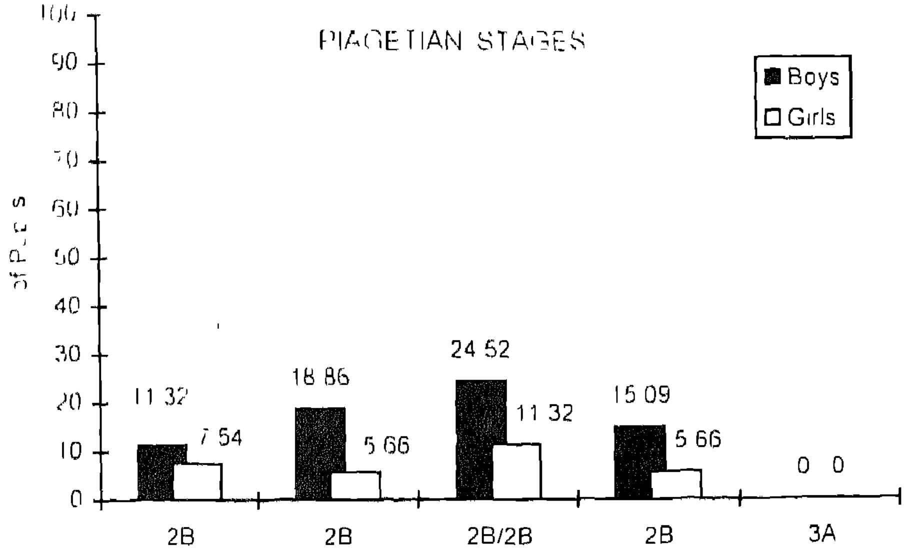

Figure 3. Distribution of pupils in various stages for class IV

ANALYSIS OF THE DATA

In the task there were fifteen distinct test items Using the assessment rules the pupils were placed in different cognitive level. The number and the percentage of boys and girls in different cognitive development level is given in Table 3

TABLE 3
Distribution of Pupils Amongst Stages

Stage	*No. of Boys*		*No of Girls*		*Percentage of Boys*		*Percentage of Girls*	
	Class III	*Class IV*	*Class III*	*Class IV*	*Class III*	*Class IV*	*ClassIII*	*Class IV*
2B	4	6	8	4	7 69	11 32	15 38	7 54
2B	13	10	7	3	25	18 86	13 46	5 66
2B/2B	10	13	2	6	19.23	24 52	3 84	11 32
2B	4	8	3	3	7 69	15 09	5 76	5 66
2B/3A	1				1 92			

Distribution of pupils amongst stages for class III and IV is depicted as hodographs in Figure 2 and Figure 3 respectively

The mean and standard deviation of the boys and girls of the respective classes were calculated separately and depicted in Table 4

TABLE 4
Mean Score and Standard Deviation

Class	M_T	M_B	M_G	σ_T	σ_B	σ_G
III	4.52	4 781	4 1	2 033	2 246	1.541
IV	5.07	5 1	5	1 841	1 797	1.936

From Table 4 it is clear that the mean score M_T of class IV pupils are always greater than class III pupils which shows that cognitive developmental level of class IV pupils are higher than class III pupils. Comparing the boys and girls mean score (M_B & M_G) one can conclude that boys have greater score than girls in both the classes. To see the significance of the difference the "t" values were calculated and given in Table 5

TABLE 5
Difference (AM) in the Mean Scores of Boys and Girls, "t" Values and Significance for Various Classes

Class III			*Class IV*		
ΔM	t	Significance	ΔM	t	Significance
681	1 189	Not Significant	1	18	Not Significant

ΔM values were not even significant at 5 per cent level This show that the cognitive development level of boys and girls do not differ much or the difference are not significant Hence prescribing special curriculum for girls can be ruled out.

Though the difference between girls and boys cognitive growth do not differ much, however the lower score of girls compared to boys and lower cognitive development of girls can perhaps be explained by the following hypothesis.

- Under nutrition and less care for the girl child in the Indian society effect the cognitive growth.
- Negative attitudes towards a girl child for studies also effect the cognitive growth.

CONCLUSION

The analysis ascertained the following hypothesis.

- Pupils of the same chronological age do not belong to the same cognitive development level
- The percentage of boys at higher developmental level are alway higher than the girls.
- The mean score of boys are always higher than the boys though no significant.

POTENTIAL AREA OF RESEARCH

Some of the issues which can be investigated leading to crucial outputs are the following:

- Degree of match/mismatch between the developmental level of the primary class pupils and the cognitive demand of the curriculum
- Designing of a MLL (minimum levels of learning) on the basis of the above findings.
- Designing of strategies through research to generate acceleration in the cognitive growth of the pupils

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Impact of Teachers' Behaviour in Terms of Management of Available Learning Resources on Scholastic Achievement and Interest of Standard V Primary School Children

Sneha Joshi and Ashutosh Biswal

The study examines the effect of management of learning resources by teachers on scholastic achievement and interest towards teaching learning of standard V students, taking intelligence and SES as co-variates.

Findings indicate that. (i) the achievement in English, mathematics, science and social studies of students in well managed schools of learning resources was significantly higher than the achievement among the poorly managed schools of learning resources. On Hindi achivevment, when intelligence was taken as a co-variate, the two quality managed schools did differ significantly. While, on Hindi (with SES as a co-variate) and Gujarati achievement, the two quality managed schools did not differ significantly (ii) The mean interest score of students from schools with well management of learning resources was significantly higher than that of students from schools with poor management of learning resources. The management of learning resources and interest of standard V students towards teaching learning were directly related.

The study implied that creating interest among students can enhance enrolment and retention. This could be achieved through adequate use and proper management of learning resources in the classes by teachers. Primary teachers need to be trained to manage learning resources timely and maximally. This has implications for teacher training programme at the primary level. Quality of learning resources are not to be allowed to go waste. Proper monitoring of utilisation of learning resources needs to be undertaken. Teaching language subjects should not get least attention by teachers. Low-cost and no-cost learning resources could be prepared by schools for use with primary classes.

INTRODUCTION

Universalisation of Elementary Education being the National priority, the National Policy on Education,1986 emphasised that new thrust in Elementary Education will focus on three aspects· (i) Universal access and enrollment, (ii) Universal retention of children upto 14 years of age, (iii) a substantial improvement in the quality of education to enable all children to achieve essential levels of learning. Along with other activities and incentives appropriate teacher behaviour is one of the main instruments in achieving universalisation of Elementary Education Positive teacher behaviour can create interest of children towards teaching learning, making school a place of joy, which could help in increasing enrollment, decreasing drop outs and improving the quality of education. But it is not satisfactory. Teacher behaviour is found quite demotivated. Teachers, being the main vehicle to transact the total classroom activities appeared to be highly demotivated and totally ineffective in performing his/her task (Singh & Saxena 1995). The most important behaviour of teacher, which influences children maximally is his classroom behaviour The total classroom behaviour of the teacher largely depends on the management of the available learning resources. Whatever learning resources are available in schools (Basic or Supplementary or Advanced) should be managed properly to improve the standard of the schools According to the availability of learning resources in our schools, learning resources can be classified into three categories like, basic learning resources, e.g , black-board, duster, chalks, textbooks for teachers, etc , supplementary learning resources, e.g., textbooks for students, globe, game instruments, charts, maps, models, maths set, supplementary books, etc , and advanced learning resources, e.g., teaching machine, radio, tape recorder, computers, OHP, film projectors, slide projector, opaque projector, science lab, TV, well equipped library, etc. Similarly, according to the management of learning resources schools can be classified as well managed, moderate managed and poor managed.

It is assumed that adequate facilities of learning resources and well management of those are pre-requisites of better learning in terms of pupil's achievement. In this study attempts has been made to study the effect of well management of learning resources by teachers on the achievement of pupils in different subjects controlling the variables like socio-economic status of the parents and intelligence of the students. Intelligence and SES have been controlled becaused the schools with well management of learning resources attract students from the families of high SES and those schools also take students on the basis of mental ability test.

REVIEW OF RELATED LITERATURE

Review of related literature focused on the effect of different variables on the achievement of primary school children in different school subjects. The studies summarised in the five Surveys of Research in Education published by NCERT indicated that pupil achievement was found to be related to general mental ability and motivation of the pupil, availability of the teacher per class group, level of general and professional education of the teacher, facilities available in the school, instructional climate and leadership of headmaster

The socio-economic conditions of the parents of school type (government or private managed) provided better teaching learning situation (Kulkarni 1970).

Achievement of standard IV pupils in mathematics and language was positively related with father's education, facilities for learning and educational environment at home. The variables related to schools and teachers indicated somewhat weak relationship with ahievement (Shukla 1994).

According to Jangira (1994), the individual level predictors for language achievement were educational and occupational aspiration, teacher coming to class regularly, TV watching, receiving dictation and feed back on tests, opportunity to read materials other than textbooks, language of instruction, difficulty in understanding teachers'language and availability of textbooks. For prediction of mathematics achievement, the individual level variables were father's education, reading other material, correcting home work regularly, educational and occupational aspiration and understanding teacher's language. The group level predictors viz. asking children to read from textbook on their own and reading from textbooks and explaining were predictors for Language achievement For mathematics achievement, class size and teacher's expectations were found to be significant predictors

According to Muralidharan et al. (1994) and Gupta & Gupta (1995), the achievement of Operation Blackboard school pupils was significantly higher than those studying in non-OB schools.

According to Singh & Saxena (1995), parent's charcteristics, viz, parent's education and father's occupation have positive association with pupil's achievement. The contribution of teacher's qualification to the achievement across states is not statistically significant, however, the size of contribution is varying across states. The teaching experience and inservice teacher's training is negatively associated with achievement in mathematics and language. Duration of teacher's stay in the school tends to be positively associated with pupil's achievement. The factors of educational and physical facilities in schools have positive association with school mean achievement in mathematics The number of teacher and pupil-teacher ratio have negative association with achievement School academic climate like teacher frequently taking tests and providing feedback and teacher assigning homework and correcting have positive and strong association with school mean in mathematics and language Teacher commitment, parent's involvement and head teacher as leader had positive assocation with school achievement.

Teacher's commitment has a positive impact on learning achievement of children (Jain & Arora 1995)

Buch and Buch (1983) synthesised more than 200 studies focusing on the determinants of learning outcomes at the level of primary education. The correlates of pupil's performance are categorised into three groups as family characteristics, school characteristics and individual characteristics. Parents' social class, education and occupation and family environment are found to be significant influencing variables among the family characteristics Facilities and equipments in the school, institutional climate and leadership behaviour of the principal, teacher qualification and training, high morale of teacher and positive perception of the academic ability of learner constitute a powerful set of factors determining the learning levels of children.

SES was positively and significantly related to the achievement in subjects like arithmetic, general science and social studies (Shukla, 1984) Malik (1984) found that children of illiterate parents had significantly lower academic achievement after controlling their SES and intelligence

It can be summarised from the findings of the above studies that there was no consistency in relationship between the achievement of pupil and related variables Further, only language and mathematics were included in most of the studies as the predictors of pupils' achievement Other subjects like social science, general science were not included in most of the studies Also none of the studies mentioned about the particular language considered in the studies.Very few studies had been conducted on the effect of teachers' behaviour in terms of management of learning resources on total scholastic achievement of pupils and their interest. The present study is an attempt in this direction

Statement of the Problem

Impact of Teachers' Behaviour in Terms of Management of Available Learning Resources on Scholastic Achievement and Interest of Standard V Primary School Children.

OBJECTIVES

The objectives of the study were as follows:

1. To study the effect of management of learning resources by teachers on scholastic achievement and interest towards teaching-learning of standard V students taking intelligence as co-variates.
2. To study the effect of management of learning resources by teachers on sholastic achievement and interest towards teaching-learning of standard V students taking SES of parents as co-variates

METHODOLOGY

The methodology of the study was as follows.

Sample

Ninety standard V students from four schools of Baroda city were taken as sample for the study. The procedure of selection of the sample was as follows.

To study the availability and management of learning resources in primary schools/sections a questionnaire was prepared. The questionnaire was administered in fifty schools including state government schools, private aided schools, corporation schools, central schools and public schools. Ten schools were selected on the basis of questionnaire survey, of which five were poor in learning resources management and five were well managed in their learning resources. All the schools were observed for one month to study the management and use of their learning resources in the primary sections. On the basis of questionnaire survey and observation four schools were selected of which two were poor managed and two were well managed in their learning resources. Schools were paired in terms of their teachers' strength, students'strength, teacher-pupil ratio, teachers' qualification, teachers' experience in those schools, teachers' training, salary and facilities available for teachers, location of the schools, syllabus prescribed, medium of instruction and infrastructure facilities. Forty-five students were selected randomly from each pair of schools which constitute the sample for the study.

Tools

Following tools were used for the present study.

Shukla's tests of measuring intelligence of Gujarati children were used to measure the intellingence of standard V students. These were individual tests based on Standford Revision of the Binet Simon Tests.

Achievement tests on mathematics, science, social science, English, Hindi and Gujarati were prepared and used to measure the scholastic achievement of the students Each test was objective type in nature consisting of fifty items.

Interest Inventory

To study the interest of standard V students towards teaching learning an interest inventory was used prepared by the researchers Thirty items were there of interest towards teaching learning.

Socio-Economic-Status Inventory

To study the SES of the parents of standard V students an SES inventory was used prepared by the researchers. Thirty items were there on SES of parents.

DATA ANALYSIS AND INTERPRETATION

Data was analysed using ANCOVA. Qualitative analysis was also done to measure the management of learning resources by teachers Summary of ANCOVA and their interpretation is as follows

TABLE 1.1

Summary of ANCOVA for Achievement on Mathematics Taking Intelligence as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	1304 881	1304 881	16 991*
Within	87	6712 679	77 157	
Total	88	8017 561		

Unadjusted mean for 1st group = 18 311
Adjusted mean for 1st group = 21 274
Unadjusted mean for 2nd group = 33 244
Adjusted mean for 2nd group = 30 281

TABLE 1.2

Summary of ANCOVA for Achievement on Science Taking Intelligence as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	1748 917	1784 917	25.444*
Within	87	6103 032	70.149	
Total	88	7887.949		

Unadjusted mean for 1st group = 19.311
Adjusted mean for 1st group = 21.532
Unadjusted mean for 2nd group = 34.288
Adjusted mean for 2nd group = 32.067

TABLE 1.3
Summary of ANCOVA for Social Science Taking Intelligence as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	6217.386	6217.386	95.937*
Within	87	5636.071	64.782	
Total	88	11853.46		

Unadjusted mean for 1st group = 17.088
Adjusted mean for 1st group = 17.506
Unadjusted mean for 2nd group = 35.533
Adjusted mean for 2nd group = 35.115

TABLE 1.4
Summary of ANCOVA for Achievement on English Taking Intelligence as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	1262.21	1262.21	23.252*
Within	87	4722.558	54.282	
Total	88	5984.768		

Unadjusted mean for 1st group = 18.422
Adjusted mean for 1st group = 20.266
Unadjusted mean for 2nd group = 30.955
Adjusted mean for 2nd group = 29.111

TABLE 1.5
Summary of ANCOVA for Achievement on Hindi Taking Intelligence as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	504.534	504.534	9.257*
Within	87	4741.722	54.502	
Total	88	5246.256		

Unadjusted mean for 1st group = 29.688
Adjusted mean for 1st group = 31.635
Unadjusted mean for 2nd group = 27.93
Adjusted mean for 2nd group = 25.987

TABLE 1 6

Summary of ANCOVA for Achievement on Science Taking SES of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	1406 499	1406 499	16.958*
Within	87	7215 761	82 239	
Total	88	8622 269		

Unadjusted mean for 1st group = 19 311
Adjusted mean for 1st group = 19 124
Unadjusted mean for 2nd group = 34 288
Adjusted mean for 2nd group = 34 475

TABLE 1 7

Summary of ANCOVA for Interest in Teaching Learning Taking Intelligence as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	15461 97	15461 97	172 517*
Within	87	7797.403	89 625	
Total	88	23259 37		

Unadjustedmean for 1st group = 43 8
Adjusted mean for 1st group = 47 175
Unadjusted mean for 2nd group = 77.555
Adjusted mean for 2nd group = 76.180

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* = Significant at 0.01 level F-value for df1 = 1 & df2 = 87
** = Not significant at 0 05 = 3, at 0 01 = 6 92

Students of school poor in management of learning resources = 1st group
Students of school rich in management of learning resources = 2nd group

TABLE 2.1

Summary of ANCOVA for Achievement on Mathematics Taking SES of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	1291 091	1291 091	13.246*
Within	87	8479 391	97.464	
Total	88	9770.481		

Unadjusted mean for 1st group = 17 911
Adjusted mean for 1st group = 18 257
Unadjusted mean for 2nd group = 33 311
Adjusted mean for 2nd group = 32.964

TABLE 2.2

Summary of ANCOVA for Achievement on Science Taking SES of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	1406 499	1406.499	16 958*
Within	87	7215.761	82 939	
Total		88	8622 269	

Unadjustedmean for 1st group = 19 311
Adjusted mean for 1st group = 19.124
Unadjusted mean for 2nd group = 34 288
Adjusted mean for 2nd group = 34 475

TABLE 2.3

Summary of ANCOVA for Achievement on Social Science Taking SES of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	2160 057	2160 057	32 442*
Within	87	5793.631		
Total	88	7952.687		

Unadjusted mean for 1st group = 17 08
Adjusted mean for 1st group = 16 913
Unadjusted mean for 2nd group = 35.666
Adjusted mean for 2nd group = 35 841

TABLE 2.4

Summary of ANCOVA for Achievement on English Taking SES of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	1134.376	1134 376	19 0777*
Within	87	5173.089	59.46	
Total	88	6307 465		

Unadjusted mean for 1st group = 18.337
Adjusted mean for 1st group = 18.007
Unadjusted mean for 2nd group = 31.442
Adjusted mean for 2nd group = 31 792

TABLE 2 5
Summary of ANCOVA for Achievement of Hindi taking SES of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	5 781	5 781	9 166544E-02**
Within	87	4741 722	54 502	
Total	88	5246 256		

Unadjusted mean for 1st group = 29 688
Adjusted mean foe 1st group = 28 319
Unadjusted mean for 2nd group = 27 933
Adjusted mean for 2nd group = 29 303

TABLE 2 6
Summary of ANCOVA for Achievement on Gujarati taking SWS of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	234 056	234 056	3.276**
Within	87	6215.322	71 44	
Total	88	6149.378		

Unadjusted mean for 1st group = 35.066
Adjusted mean for 2nd group = 23 78
Unadjusted mean for 2nd group = 28 755
Adjusted mean for 2nd group = 30 042

TABLE 2 7
Summary of ANCOVA for Interest in Teaching Learning Taking SES of Parents as Co-variate

Sources of Variance	*df*	*ss*	*mss*	*F*
Among	1	5642 795	5642.795	43 123*
Within	87	7797.403	89 625	
Total	88	23259 37		

Unadjusted mean for 1st group = 43 777
Adjusted mean for 1st group = 43 777
Adjusted mean for 1st group = 44.715
Unadjusted mean for 2nd group = 76.4
Adjusted mean for 2nd group = 75 462

* = Significant at 0 01 level	F-value for df1 = 1 df2 = 87
** = Not significant	at 0 05 = 3 95, at 0 01 = 6 92

Students of schools poor in management of learning resources = 1st group
Students of schools rich management of learning resources = 2nd group

From Table 1.1 and Table 2.1 it was observed that the F-values for two groups on achievement in mathematics were 16.911 and 13 246 for co-variated intelligence and SWS respectively. Both were found significant at 0.01 level with df 1/87. So the null hypothesis "there will be no significant difference between the adjusted mean achievement scores on mathematics of students of poor managed schools and well managed schools taking intelligence and SES as co-variate separately" was rejected. The adjusted means of 1st group(21.274 & 18 257) and 2nd group (30 281 & 32.964) shows that the achievement in mathematics of students in well managed schools was significantly higher than the achievement in mathematics of students in poor managed schools.

From Table 1.2 and Table 2.2 it was observed that the F-values for two groups on achievement in science were 25.444 and 16.958 for co-variates intelligence and SES respectively. Both were found significant at 0.01 level with df 1/87. So the null hypothesis "there will be no significant difference between the adjusted mean achievement scores in science of students of poor managed school and well managed school taking intelligence and SES as co-variate separately" was rejected. The adjusted means of 1st group (21.532 & 19.124) and 2nd group (32.067 & 34.475) shows that the achievement in science of students in well managed schools was significantly higher than the achievement in science of students in poor managed schools.

From Table 1.3 and Table 2.3 it was observed that the F-values for two groups on achievement in social sciences were 95.973 and 32.442 for co-variated intelligence and SES respectively. Both were found significant at 0.01 level with df 1/87. So the null hypothesis "there will be no significant difference between the adjusted mean achievement scores on social science of students of poor managed school and well managed school taking intelligence and SES as co-variate separately" was rejected. The adjusted means of 1st group (17.506 & 16.913) and 2nd group (35.115 & 35.841) show that the achievement in social sciences of students in well managed schools was significantly higher than the achievement in social sciences of students in poor managed schools.

From Table 1.4 and Table 2.4 it was observed that the F-values for two groups on achievement in English were 23.252 and 19.077 for co-variates intelligence and SES respectively. Both were found significant at 0.01 level with df 1/87. So the null hypothesis "there will be no significant difference between the adjusted mean achievement scores in English of students of poor managed school and well managed school taking intelligence and SES as co-variate separately" was rejected The adjusted means of 1st group (20.266 & 18.007) and 2nd group (29.111 & 31.792) show that the achievement in English of students in well managed schools was significantly higher than the achievement in English of students in poor managed schools.

From Table 1.5 it was observed that the F-value for two groups on achievement in Hindi was 9.257 for co-variates intelligence which was found significant at 0 01 level with df 1/87. So the null hypothesis "there will be no significant difference between the adjusted mean achievement scores in Hindi of students of poor managed school and well managed school taking intelligence as co-variate" was rejected. The adjusted means of 1st group (31 635) and 2nd group (25.987) shows that the achievement in Hindi of students in well managed schools was significantly lower than the achievement in Hindi of students in poor managed schools.

From Table 2.5 it was observed that the F-values for two groups on achievement in Hindi was 9.166544E-02 for co-variate SES which was found not significant at 0 01 or 0 05 levels. So the null hypothesis "there will be no significant difference between the adjusted mean achievement scores in Hindi of students of poor managed school and well managed school taking SES as co-variate" was retained.

From Table 1.6 and Table 2 6 it was observed that the F-values for two groups on achievement in Gujarati were 1.973348E-02 and 3.276 for covriates intelligence and SES respectively Both were found not significant at 0.01 and 0.05 levels. So the null hypothesis "there will be no significant difference between the adjusted mean achievement scores in Gujarati of students of poor managed school and well managed school taking intelligence and SES as co-variate separately" was retained.

From Tabel 1.7 and Table 2.7 it was observed that the F-values for two groups on interest in teaching learning were 172.517 and 43.123 for co-variates intelligence and SES respectively. Both were found significant at 0.01 level with df 1/87. So the null hypothesis "there will be no significant difference between the adjusted mean scores on interest in teaching learning of students of poor managed school and well managed school taking intelligence and SES as co-variate separately" was rejected The adjusted means of 1st group (45.175 & 44 715) and 2nd group (76.18 & 75.462) show that the interest in teaching learning of students in well managed schools was significantly higher than the interest in teaching learning of students in poor managed schools

Major Outcomes

Major outcomes of the study were as follows.

There were significant differences between the mean achievement scores in mathematics, science, social science and English of students from schools with well management of learning resources and poor management of learning resources in case of both the co-variates, i.e., intelligence and SES of parents It showed that students 'achievement in mathematics, science, social science and English is directly proportional with teachers' behaviour in terms of management of learning resources

- The mean achievement scores of students in mathematics,science, social science and English from schools with well management of learning resources were significantly higher than that of students from schools with poor management of learning resources
- In Gujarati it was found that there was no significant difference between the mean achievement scores of students from schools with well management of learning resources and poor management of learning resources in case of both the co-variates, i.e , intelligence and SES of parents. Also in Hindi, it was found that there was no significant difference between the mean achievement scores of students from schools with well management of learning resources and poor management of learning resources while taking SES of parents as co-variate. But the finding was interesting while taking intelligence as co-variate. There was significant difference between the mean achievement scores of students from schools with well management of learning resources and poor management of learning resources But the adjusted mean of 1st group (poor managed schools) was significantly higher than that of 2nd group (well managed schools). It can be said that in the subjects like Hindi and Gujarati the impact of teachers' behaviour is not significant in terms of management of learning resources. In other words it can be said that teachers rarely use any learning resources in the subjects like Hindi and Gujarati.
- There were significant differences between the mean scores of interest towards teaching learning of students from schools with well management of learning reaources and poor management of learning resources in case of both the co-variates.
- The mean interest score of students from schools with well management of learning resources was significantly higher than that of students from schools with poor management of learning resources.
- More the management of learning resources, more the interest of standard V students towards teaching learning, hence more the academic achievement

Implications of Findings for Universalising Elementary Education.

- For increasing the enrollment and decreasing drop outs, one of the most important factors is the interest of students towards teaching learning, which could be created among primary school children through adequate use and proper management of learning resources in the classes by the teachers. The same could help to increase the quality of primary education by improving the scholastic achievement of students in different subjects

- Teachers of primary education should be trained to realise the importance of learning resources and how to manage them properly
- Quality learning resources shöuld be provided to only those needed schools where the teachers could use those maximally and optimally.
- Proper care should be taken to monitor different schools, to see whether the available learning resources are being utilised properly
- One of the important factors of teachers' behaviour is the management of learning resources properly, maximally and timely. Primary teachers should be trained through inservice training to manage learning resources maximally, properly and timely
- For subjects like mathematics, science, English in the primary schools appropriate learning resources should be identified and be supplied. And it should be compulsory to manage (use) those in time and it should be properly supervised
- Learning resources should also be used while teaching Hindi and Gujarati These subjects should not be ignored as easy subjects
- Low cost and no cost learning resources could be prepared by the schools with the help of community and higher standard students, which could be used for primary classes

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Teaching-Learning Process in Schools with Consistently Good or Poor Results

N. Pradhan and M.V. Mistry

The study is based on observation of instructional process in the classrooms of I to V standards for 20 days in two selected primary schools, under the Baroda Municipal Corporation, one having consistently more then 80 per cent retention rate and more than 90 per cent students passing in V standard, and the other having consistently less than 20 per cent retention rate and less than 40 per cent students passing in V standard. Unstructured interviews were conducted with teachers, principals, students, etc , to gather data on student-teacher interaction and factors that contribute to differential results

The study revealed that factors contributory to good results inter alia include mastery (of teachers) in the subjects, pre-teaching activities, child-centred teaching, encouraging students to ask questions and participating actively, and healthy student-teacher, student-student and teacher-teacher interaction The good result school is located in an area inhabited by educated community ·Besides the teachers' ability, willingness and devotion to help children, availability of appropriate infrastructure facilities in the school and dynamic leadership qualities of the Head of the institution makes all the difference contributory to good results The poor result school was found lacking infrastructure facilities and certain other aspects that contributed towards the other school to became a good result school.

INTRODUCTION

Providing quality primary education has been the main focus since 1986 after the formulation of National Policy on Education. There has been quantitative expansion of primary education since independence and this has been a constitutional obligation. But it is essential that along with the increase in number of schools and students enrolment, there should also be quality learning Quality learning at this stage is esssential because it provides a sound base to children for their allround development This is not just possible by ensuring adequate building, large infrastructure, or appointment of highly qualified teachers Quality education demands appropriate methods and approach followed by the teachers to exalt the personality of children In such a process, the children may like to come to the school, study there and complete their schooling successfully Therefore the researchers have undertaken the present study to find out answers to some important questions as follows

1 Whether good result school and poor result school differ in terms of instructional methods and approach followed by the teachers?
2 What sort of student-teacher interaction prevail in poor result school and good result school?
3 What are the factors that make a school as poor result school or a good result school?

GOOD RESULT AND POOR RESULT SCHOOL

Here in this study a good result primary school is the one which has muximum retention and consistently good academic results at V stardard over the last five years Whereas a poor-result school is one which has low retention rate and consistently poor academic result at V standard over the last five years

OBJECTIVES

The study has been conducted with the following objectives

1 To study the adequacy of infrastrctural facilities available and utilised by teacher of good result school and poor result school
2 To study the methods of teaching followed by teacher in good result school and poor result school
3 To study the nature of student teacher interactions existing in good result school and poor result school
4 To study the factors that differentiate between a good result school and poor result school.

METHODOLOGY

Case study method was followed to conduct this study A comprehensive list of 138 Baroda Municipal Corporation primary schools were listed with the rate of retention and V standard school result Out of the list, a school was selected having consistently more than 80 per cent retention rate and more than 30 per cent students passing in V standard The other school was selected having consistently less than 20 per cent retention rate and less than 40 per cent passing at V standard Consistency in retention rate and passing percentage was considered by taking five years data. The investigators observed the instructional process in the classrooms of I standard to V standard for 20 days. Unstructured interviews were conducted with the teachers, principal, students, and peons to reveal the data pertaining to the student-teacher interacation, differential factors that contribute to the result of their school. The data collected was analysed qualitatively. The study reveals the following findings.

FINDINGS

1. Good result school teachers have subject mastery and do pre-teaching activities but poor result school teachers do not have subject mastery, and do not do any pre-teaching activities

2 Teachers of good result schools follow student centred methods of teaching and encourage students' questions and participation but the teachers of poor result school mainly follow teacher centred methods and discourage students'questions and participation during teaching.

3. There exists a healthy interaction among students-teachers, students-students, and teachers-teachers in good result schools, but in poor result schools the interaction among the students, teachers and students-teachers is not very congenial The teachers have always some other work to attend to than teaching They do not stay in the school for the whole day.

4. It was found that the good result school is located in an educated community but poor result school is located in an uneducated community and mainly attracts students from the slum areas. Further the good result schools had good building and adequate infrastructure but poor result schools do not have good building facility, drinking water, electricity and lavatory facilities.

5. The principal of a good result school is, B A , B.Ed and possesses dynamic leadership quality. The principal of poor result shcool is S.S.C passed with PTC. He is there in the school since the last twelve years and is a resident of that area. He lacks dynamism and is not solely devoted to the improvement of the school

6 The factors that differentiate a good result school from a poor result school are the method of instruction followed by the teachers, teachers'ability, willingness, and devotion to help the children, and the infrastructure facilities available in the school. However, if the principal is dynamic and able, he can make the shool a good result school.

IMPLICATIONS

To make quality improvement in the primary schools, the teacher should be an able one and he should be willing to understand and help the children. Child centered methods of instruction be followed by the teachers and the schools should have adequate infrastructure facilities. The principal should be a dynamic leader and be able to mobilise the community. He shall involve the local community in almost all the school activities

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Learner Centred Science Education Programme

V.V. Moreshwar

The innovative science programme for classes V, VI, and VII is based on the principles of learning through activitly, learning by discovery and learning from environment After orienting the teachers in several awareness workshops and giving practical exposure to the new philosophy of learning by doing, with collective efforts of subjects experts, project workers and primary school teachers, the workbooks and corresponding kit material were developed The project teachers were provided a week-long training, twice a year The teaching learning in schools was monitored by regular visits of project workers atleast once a week The teachers were provided forums through monthly meetings for exchange of ideas and experiences

Based on the feedback from teachers, students and experts, curricula and workbooks were suitably modified in developmental workshops involving experts and teachers On the students' front, the experiment was found very successful They really love to do things with their own hands and their participation in teaching learning process and activities was above expectations But still there are certain grey areas and some fundamental problems that need to be taken care of appropriately It was observed that the students entering the V standard lack many essential abilities such as reading, writing, and mathematics abilities, etc , which were expected to be developed on completion of the IV standard Whereas the students could do activities, they feel difficulty in discussions, anslysing information and drawing conclusions It has, therefore, been suggested that elementary education may be provided in the students' own language with gradual switch over to standard language

The textbooks of primary and upper primary classes may be revised to include the philisophy of learning by doing and learning from environment. The primary school teachers appointed in schools with minimum qualification as secondary with PTCF training find it difficult to cope with several topics included in the syllabiv It has, therefore, been suggested that for Science and Mathematics teaching in primary classes, the minimum academic qualification may be Higher Secondary and the professional PTC course may inter alia include the basic principles and methodology of Learner-Centred Science Education Programme This will enable them to cope with the teaching of science and mathematics as per the child-centred approach of teaching learning

INTRODUCTION

The Learner-Centred Science Education Programme is an innovative Science Teaching Programme for classses V, VI and VII based on the principles of "Learning through activity, Learning by discovery and Learning from environment." The basic inspiration of this project has come from the similar but much more widespread "Hoshangabad Science Teaching Programme, " in M.P having been a first exposure to the HSTP by the author, his continuous efforts of gathering a proper group and to try out similar kind of programme are now resulted in this LCSTP programme

This is a five year pilot project for an entirely different science teaching approach, one of the ideal alternatives of the existing science education which has totally failed in achieving its goals. Here the importance of the experiments is profoundly emphasised. The whole class is divided into groups of four and each group has to perform each and every activity described in the workbooks. The workbooks, kit for experiments and all other necessary; materials are provided by the field centre.

The programme is currently running in 345 primary schools of 4 districts Gandhinagar, Ahmedabad, Surat and Bhavanagar in Gujarat since 1993-94. The Vikram A. Sarabhai Community Science Centre is the nodal agency while Gujarat Vidyapith, Ahmedabad; Gandhi Vidyapith, Vedchhi, Dist. Surat; and Lokbharti, Sanosara, Dist. Bhavanagar, are the field centres.

SPECIFIC OBJECTIVES

In general the main objective of the LCSTP programme is "to develop an ability to make observations, to do experiments to analyse the information obtained from the experiments and observations, and to draw conclusions from the analysis" among the students.

To achieve this the programme has multiple specific tasks to be achieved within five years such as

- To enlist the conceptual, theoretical and practical abilities to be developed by the students during their study from standard V to VII
- To design the curriculum satisfying the needs to develop the above listed abilities.
- To design the child-centred and experiment oriented textbook-cum-work book based on the above curriculum
- To train the teachers from the selected schools, both conceptually and academically for the curriculum and convince them with the philosophy of the programme that "teachers and students ought to be participants in the process of mutual learning."

- To design kits for the experiments given in the work book and to work out the system to distribute it in schools.
- To work out proper system for getting continuous feedback from teachers and students.

METHODOLOGY

The very first step of such a programme is always to motivate the teachers. This was achieved by a number of awareness workshops. Some of these workshops had been organised even before the beginning of the programme These workshops involved not only the discussions on the current teaching process and its alternatives but also a practical exposure to the new philosophy of learning by doing.

Simultaneously a number of work shops were organised to develop the academic material. As a result of the collective efforts of subject experts, project workers and primary teachers, the work books "Prayog Karine Viguyan Shikhie" and corresponding kit material was developed.

These workbooks 'Prayog Karine Vigyan Shikhie' are entirely different from the conventional text books and hence an intensive training is necessary for the teachers which is given in a week long training workshops twice in a year. Here exact classroom situation is created with teachers playing the role of the students and perform each and every activity described in the book followed by corresponding discussions.

It is observed that after such an intense training also, teachers have many conceptual and practical difficulties. Hence a system for regular visits to schools is developed in which the project workers visit each school at least once a week where they try to get feedback about the work books from both, teachers and students. At the same time they also try to solve difficulties of the teacher.

Besides these regular feedback visits another major occasion where all the teachers and the whole project staff meet, is the monthly meetings. Such meetings are organised every month and play a vital role for mutual exchange of experience, thoughts and for obtaining the collective feedback from teachers. At the same time they also help to solve many of the problems, either academic or administrative, experienced by the teachers. For this, often subject experts and administrative authorities are invited to such meetings.

The last step is to update the curriculum and the workbooks with the help of the feedback from teachers, students and also from the experts. From the feedback visits and the monthly meetings a large number of comments and suggestions are obtained. These are then analysed in the material development workshops again in the presence of experts and teachers, and the books are modified accordingly.

MAJOR OUTCOMES

This project has now completed three years so we have enough experience to state its major outcomes

Support from Administrative Authorities

Initially the project was received with great enthusiasm by teachers and specially by the local administrative authorities. The district and state legal authorities also paid fair attention. They facilitated the project by issuing some revolutionary orders such as allowing the workbooks developed in the project as textbooks in the selected schools etc.

Children's Participation

On the students' front also the project is very successful. They really love to do things with their own hands. There are many such activities which were initially considered as difficult but still most of the students performed them very well. Their participation was above all expectation.

But still there are many grey areas including some fundamental problems which are discussed below. Here one point is worth noting that though I have tried to treat them separately they are so closely interwoven that to analyse them individually would be far from reality. Hence it is necessary to view and analyse them as a part of the more general problem of improving the whole educational system.

Insufficient Academic Background of Students

As stated above, students' participation was very encouraging. They could perform almost all activities described in the workbooks. But there was a great lack of related discussion, analysis and conclusion In other words the educational activities became only a play and did not serve the purpose.

On detailed analysis, two major reasons emerge in this situation. The first is that the students entering V standard lack many essential abilities such as reading, writing, mathematical abilities, etc., which are to be developed up to standard IV. Second is that many activities and related discussions are over ambitious and hence for an average student it becomes difficult to draw proper conclusions.

Changing Attitude of Teachers

On the teachers' side also the response is changing due to various reasons. There are some administrative problems such as irregular payment of TA/DA, burden of many projects on the teachers, and the most important the transfer of teachers. All possible attempts are made to minimise them, but still they disturb many teachers.

Another major reason is the insufficient academic background of the teachers According to the philosophy of the programme every thing is to be verified experimentally. Now during experiment any situation may arise For example in the chapter on leaves students have to collect different leaves from outside and study their properties. Now there are enormous varieties of leaves in nature and a student can bring any of them. Similarly in the cases of physical concepts such as pressure, temperature energy, etc, since the teacher himself is not clear, it becomes very difficult to convey them to students. Naturally the teacher does not like to create such situation which they cannot handle.

Third and the most important reason is antipathy with the project. Though from very early stages serious attempts were made to create proper attitude, but with great regret it has to be accepted that those attempts did not come up to the mark. Initially it seemed that teachers had grasped the essence of the project. But that response was only due to the instantaneous curiosity. Now many teachers are not convinced with the philosophy of learning by doing. This process is too lengthy, requiring much hard work and and is of no use. They still prefer the traditional way of teaching because of straight forward and easy method

Weak Field Centre

There are similar problems with the field staff also. So far we could not have a fully motivated, capable field staff as required in the initial stage of such projects. The stand by staff has the same problems of insufficient academic background, lack of motivation, etc.

Also there are some administrative problems such as irregularity in receiving grants from the government which disturbs the whole schedule of the term. It becomes very difficult to make proper alternative arrangements

SOME SUGGESTIONS

After the detailed analysis of the above stated problems we have some concrete suggestions to improve the present educational system

Graded Introduction of Standard Language

In most of the rural areas people speak their own dialect which some time is quite different from the standard language. Thus for the first standard students the standard language becomes a foreign language only and they cannot cope with it This is the basic reason for all further problems. The only way to get rid of this is to provide the elementary education in their own language with partial introduction of the standard language. This can be achieved by preparing textbooks as follows

Standard	Local language	Standard language
1st	80%	20%
2nd	60%	40%
3rd	49%	60%
4th	80%	20%

From V standard 100 per cent education may be in the standard language It is clear that according to this approach the textbooks must be area specific That may seem difficult but is essential for the true education of the rural students

Revision of the Curriculum and Textbooks

As the textbooks of standard I-IV must be revised so as to teach the students in their own language, the text books of standard V-VII must also be revised to include the philosophy of learning by doing and learning from environment Such books should contain only the description of the experiment and the questions related to it but not the answer. The experiments should be such that the minimum additional kit is needed to perform the experiments Help of the voluntary agencies is essential in order to regularly obtain feedback and hence to improve the books

Restandardisation of PTC Syllabus

We saw that the teachers had problems about this project because this concept is new for them After being accustomed to the traditional system it becomes difficult for them to accept the change. This can be avoided if the basic principle and methodology of the project, which are universally accepted, are as a part of the PTC syllabus, so that the fresh teachers who already have the conceptual and practical grasp of the basic science teaching philosophy will not have any problem with the new textbook

Improvement of the Eligibility for PTC

From the experience of these three years it is very strongly felt that PTC after tenth standard is not at all sufficient for satisfactory science teaching even with the current syllabus The newly suggested curriculum and methodology really cannot afford it Hence for the science and mathematics, at least higher secondary level background is essential.

Tarang: The Gujarat Experience

Prerana Mohite, Hina Mankodi and Jigisha Sahasti

The study has emphasised that, to achieve the goals of primary education, there was a need not only to prepare children for school but also to prepare schools for children, to make learning more relevant to children and also to have involvement of parents in schooling. It was maintained that there was also a need to have developmentally appropriate curriculum to prepare children to succeed in primary grades

Apprising the audience of the philosophy of 'Tarang', it is stated that the programme aims to create ripples in the community, teachers, children and parents. It is a competency-based child-centred early childhood education programme introduced in the state of Gujarat. It contains activities and experiences which a teacher can conduct in a typical Indian classroom with sixty children and one teacher. The programme is based on playway approach and is child-centred Teachers have been especially trained for its implementation at the resource centre of faculty of Home Science, MS University, Baroda.

The programme aimed to bring about 100 per cent enrollment in six year olds in class I to ensure their regular attendance and completion of education upto class V, to motivate teachers to initiate activity oriented joyful learning, to build a child friendly school environment, and to involve community and panchayat bodies more closely in primary education.

During the first phase, the programme was implemented in class I of all schools of 8 districts of Gujarat, and in the phase in 1996 the entire state implemented the programme.

The programme package consisted of a teacher's manual to conduct activities and experiences to develop competencies under minimum levels of learning, an activity guide consisting of pictures, flash cards, alphabet cards, letters, number symbols, etc. for organising games and activities, and the worksheets. District level resource teams were prepared for further training of teachers. UNICEF and SCERT representatives participated and monitored the training.

It is reported that 'Tarang' was able to provide an effctive teaching learning which was low cost, used indigenous and locally available resources, and gave teachers opportunity to have feed back sessions, allowed sharing of ideas and devises, improved strategies to develop lessons based on teachers demonstrations and discussions.

Expansion of the basic education to all is the precondition of any development India recognised the need for free and compulsory education for all children at the time of independence and had made this a part of its constitution and subsequent five year plans. Effects at both the National and the State level has led to noteworthy educational achievements and gains. On the other hand the enormous population—846 3 million in 1991, impedes progress with all efforts being overshadowed Thought India has the world's largest Elementary school system, it also has the largest number of out of school children and adult illiterates.

India is one of the world's nine most populous countries which met in December 1993 at Delhi for Education For all Summit. These nine high population countries recognised that education is at the heart of sustainable development. Investing in education, especially primary education, is fulfillment of a basic human right, bridge toward slower poupulation growth, higher economic productivity and a more peaceful, tolerant and democratic society. (Education for All, 1994).

One of the goals of Education for All (EFA) in India includes Universalisation of Elementary Education (UEE) focusing on:

- access to elementary education for all children up to 14 years of age,
- universal participation till they complete the elementary stage through formal or nonformal education programmes,
- universal achievement at least of minimum levels of learning.

It was thought therefore that UEE is contextual, should be district or state specific, should involve people's participation and introduction of Minimum Levels of Learning in schools to improve learner achievement

For this goal to realise, there arose a pronounced need for preparing children for shcool and preparing schools for children. This became crucial in situations dominated by economic disadvantage where a large proportion of children require intervention which go beyond the locus and range of traditional school.

Since school forms the primary context for children's development, it is necessary to recongnise the multiplicity and complexity of children's learning envrionments. Entering the schools marks a significant step in children's lives especially for those children who have never been to the pre-primary school.

The concern of policy makers and educators as well as parents around the world is for preventing school drop out and repetition. The transition literature reported by the Bernard Foundation (1993) draws our attention to three aspects of education system, particularly at the earliest stages. One is the preparation of children for school, second is the preparation of schools for children by making learning more relevant to children and the third is the involvement of parents.

In this process, a developmentally appropriate curriculum is a positive alternative to first grade curriculum and bettter prepares children to succeed in the primary grades. But in view of the long standing tradition of diverse approaches to pedagogy in the field, what is the best approach in a given cultural context? Is an eclectic position feasible so that the best pedagogy is evolved? Are the concerned planners of curriculum and pedagogy able to transcend the required competence to the teachers of primary schools? Are there adequate inputs at the pre-service level of training? Katz (1995) points out three interrelated questions. (1) What should be learned? (2) When should it be learned? (3) How is it best learned? These three questions are interrelated and the child development knowledge base will play a significant role in drawing optimal linkages between goals, development and pedagogical aspects of the programme Further Katz (1995) mentions that an appropriate pedagogy or curriculum is the one that takes into account the acquisition of knowledge and skills in such a way that the dispositions to use them and positive feelings towards them are also strengthened. This becomes a major challenge for the primary education personnel at the middle and grass-root levels

THE STATE OF GUJARAT

Gujarat achieved substantial increase in literacy rate of both male and female in the last twenty years, from 46.1 per cent for male and 24 8 per cent for female im 1971 to 72.2 per cet and 48.5 per cent in 1991. In terms of access to schools, Gunjarat has successfully brought primary education within the reach of the majority of the population Today, virtually all the villages in the state (97 per cent) have a primary school in their habitation, according to the Fifth All India Educational Survey. Despite this improved access, still almost one fourth of children of eligible age group (6 to 11 years old) do not get enrolled as of 1986 The gross drop-out rates in primary schools of Gujarat are between 40 to 45 per cent on an average Further, even among those who completed five years of primary education, it is not so rare to find children who cannot read and write properly or do simple calculation due to poor quality of education.

The state of Gujarat has seen a spurt of educational activities during the last five years with the acceptance of MLL. Gujarat Government introduced the MLL programme in grade I and II of the entire state plan June, 1995.

The state Government has redesinged the curriculum and undertaken large scale training programmes for implementing MLL based curriculum in class I and II. With the vision of eminent educationist like Prof. Ravindra Dave the textbooks of first two grades too have been restructured to further operatonalise MLL approach in Gujarat

However, the MLL prescribed curriculum can go a long way when supported by child-centred, experiential, joyful learning activities, games and other strategies, This core idea of making the process of learning joyful and interesting to children has led to the design, development and implementation of "Tarang—Ulhasmay Abhyas" (Universal Primary Education through joyful learning) What is "Tarang?"

"Tarang" as the name suggests aims to create ripples in the community teachers, children and parents It is a competency-based programme.

For a competency-based programme to succeed it cannot follow the old teahing-learning method Basic changes in the pedagogy are necessary for effective implementation of the programme To fulfill this objective the Early Child Development—Learning Resource Centre (ECD-LRC) of Department of HDFS, Faculty of Home Science, M S. University, Baroda developed a package of programme—Tarang Tarang suggests activities and experiences which a teacher can conduct in a typical Indian classrom with sixty children and one teacher The programme is based on the playway approach method and is child centred One of the distinctive features of Tarang is that it gives a teacher a guideline through which participation of student/children could increase at the same time the teacher would be able to cover/teach the specified Grade I curriculum Teachers have been specially trained for implementing Tarang and resource centres have been set up.

PROGRAMME OBJECTIVES

- To ensure 100 per cent enrolment of all six year old children in class I
- To ensure regular attendance of children enrolled and their completion of primary education up to class V at least.
- To motivate teachers of class I initiate child-centred, activity-oriented, joyful learning in order to ensure retention and the achievement of MLL.
- To build child friendly school environment especially for class I through wall paintings and production/use of low cost teaching aids.
- To involve the community and Panchayat bodies more closely in primary education for achieving universal enrolment and retention as well as improving quality of education.

BACKGROUND BRIEF HISTORY

The Tarang programme was designed keeping in mind certain fundamental needs and characteristics of children, the existing infrastructural, manpower and personnel facilities of primary schools in the state and the feasibility of taking such a large scale programme to the grass root level. The programme content reflects the following characteristics and concerns·

- Considers the developmental needs and characteristics of children entering first grade.
- Focusses on providing experiential, "hands on" approach
- Process of learning is emphasised rather than mere concepts
- Participatory, child centred approach involving children as active learners is the corner stone of the entire programme
- Major curricular components of I standard have been integrated with the developmental needs, abilities and simple concepts that can be easily taught to the children.
- Emphasis on strategies which offer fun, self-expression and enhance basic skills like obervation, comprehension, problem solving, perceptual and auditory discrimination abilities These form the basic blocks for helping children learn in later standards
- Use of locally available, indigenous material to be used for all activities.
- Presentation of learning experience balanced across each day, week with increasing degree of complexity of experiences, making the package easy to use for teachers.

It was visualised that such a programme would specifically.

- prepare children for I standard since they have little or no pre-school experiences, which helps in, making the transition from informal to formal learning smooth.
- ensure that formal teaching specifically from the textbooks begins only after September, when the total enrolment of eligible children is completed.
- support the new MLL based curriculum being initiated all over the State from June 1995 with activity based strategies and materials.

Small experimental intervention programme designed to prepare children from socially and economically disadvantaged backgrounds for formal learning at school have amply supported the hypothesis that

- children need to be equipped with specific skills and competencies which ensure success in first standard
- teacher training essentially helps in creating child friendly environment and in understanding needs of children as they enter standard I.
- learning is more effective and sustained if play, activity and joyful learning experiences are provided to children.

The above outcomes can directly contribute to reducing drop-out at athe first standard and if such inputs are sustained can also help in retention of children upto the fourth standard.

PARTICIPATING AGENCIES

A series of meetings and workshops amongst the four main participating agencies GCERT, UNICEF, Dept of Primary Education, Early Child Development-Learning Resource Centre (ECD-LRC) helped in conceptualising the implementaion of the programme. The entire programme was a classic case of coordination and teamwork during all its stages of implementation and it is only as a hindsight that one can clearly demarcate the roles and responsibilities undertaken by each agency Once the core concept and implementation strategies were thrashed out and clarified the entire programme was put forward and presented to the concerned officials at the district, taluka and finally the teachers at the village level.

COVERAGE

During the first phase 1995, the programme was implemented in class I of all schools of 8 districts of Amreli, Bhavnagar, Valsad, Surat, Panchmahal, Gandhinagar, Kutch and Baroda. In the second phase 1996 the entire state implemented the programme.

TARANG MATERIALS

In designing the materials for "Tarang" a few important considerations were made keeping in mind the large scale in which they would be used. The teacher's manual along with activity, songs and story sections were the three major components of the "Tarang" material package which would provide a detailed guideline to standard I teacher for implementing the programme. Major considerations for material preparation were:

- objective of each activity leading to the achievement of M.L L.
- specificity in instructions
- use of active involvement of all children in each activity
- emphasis on large group activities
- emphasis on active involvement of all children in each activity
- implementation requiring minimum preparation by teachers
- activities moving from simple to complex
- a core of simple activities demonstrated these become complex as the programme proceeds
- single activity as well as materials used for variety of subject areas and objectives.

TEACHER'S MANUAL

The manual was designed to provide specific activities and experiences that the teachers must conduct to develop the competencies specified under the Minimum Levels of Learning The first part of the manual consists of a three month detailed programme with activities planned for each day. In the second part there are activities which have been suggested for the whole month. The activities are in accordance with the competencies and course curriculum delineated in the textbooks. The manual helps the teachers in planning and dividing the entire course curriculum according to each month. This also supports monitoring of the programme.

ACTIVITY GUIDE

This was designed to help the teachers, prepare teaching-learning aids for implementing the programme. It consists of pictures, flash cards, alphabet cards, letters, number symbol The activity guide could be used for variety of games and activities.

SONGS, STORIES

This formed important part of the total package developed for helping the teachers implement the joyful learning programme. The first standard class usally does not echo with songs sung by children or the quiet peace of children engrossed during a story session. These activities find no place in the heavy academic syllabus of the first standard, though it is well known that these are the best mediums of teaching children. This collection of stories and songs has been provided so that the teachers in the first standard are encouraged to enliven their teaching processes using these. These songs and stories have been carefully chosen and support the subject matter/ course content of the standard I textbook, be it maths, language or science. The teacher can choose the appropriate song or story related to specific topics, e g., when teaching the lessons on body parts and their cleanliness in science the teachers can sing songs on that topic. Similarly, the stories can be told, read or enacted by the teacher and the children.

The section on worksheets is the last one in this booklet amd pvovides a few examples of the kind of reading and writing exercises that the teacher can conduct in the classroom Most of the exercises suggested are such that they can be easily done using the minimum resources of the classroom (blackboard and slates). The exercises have been arranged from simple to complex for language and maths and it is advised that the teacher use them accordingly. These exercises are only samples and the teacher can make various modifications to make learning interesting.

TARANG TRAININGS

If the goals of Universal Primary Education (UPE) are to be achieved ongoing teacher training and capacity building needs to be the most important aspect of any action programme. Keeping this in mind, under the "Tarang"programme extensive trainings were offered to all cadres of teachers

In each district, Resource Centres were established as the Centre for continuous trainings Each RC covered 10-15 schools within on 8 km radius Each RC is managed by a Resource Centre Trainer who is selected from anong the good teachers of class I in the area

(First Phase) GCERT and the Faculty of ECD/LRC were the trainers for the first phase, i e., training of the District Resource Team The process of training was as follows

District Resource Team Training

Objectives

- To empower District Resource Team members conduct trainings for standard I "Tarang" programme implementation
- To orient the DRT members to the concepts, detailed content and materials to be used under "Tarang."
- To help DRT members plan and organise a district level training schedule for training and monitoring implementation of "Tarang" programme

The training was organised at the District Institute of Education and Training (DIET), Karelibaug, Baroda from 19th-24th June,1995 Eight teams each of six people participated from 8 districts, viz , Amreli, Bhavnagar, Bhuj, Gandhinagar. Panchmahal, Surat, Valsad and Baroda

To facilitate intensive input the trainees were divided into two groups One group comprised of a team each from Gandhinagar, Surat, Panchmahal. Amreli, Bhavanagar, Bhuj, Valsad and Baroda teams were grouped together. There were at least two trainers present from ECD/LRC for both teams throughout the training.

Profile of Participants

Each District Resource Training Team consisted of six members representing each of the eight districts covered under the programme. Thus in all there were 53 participants Each DRT from each of the eight comprised of one ADEI, two DIET members, three Resource Persons.

The role of the ADEIs was crucial for monitoring and providing administrative support for the programme implementation The DIET members were included in order to facilitate recurrent training and further expansion of the programme as well as to revitalise and involve the district level training mechanism The resource persons who were practising teachers were the key trainers for demonstrating the programme activities to the trainers

Training Strategy

Keeping in mind the major objective of the training, the district level resource team was empowered for further training of teachers The training was initiated by explaining the purpose of "Tarang"—its aim of making the I grade curriculum more enjoyable and relevant to the environment and development of the children The MLL would thus be achieved through games, activities, experiences and interaction rather than through traditional reading and writing Each session in the programme emphasised these objectives. As seen in the appendix each activity of the first three months was individually demonstrated.

The trainees were actually made to participate in every activity of the first three months which were individually demonstrated, and they had to follow the procedure of implementing the activity in a classroom of children as then shown Trainees went through the content of each week, day and one by one the trainers demonstrated the games/activities/strategies/songs/stories mentioned during that week/day.

This helped in familiarising the trainees with the "Tarang" material as also the activities themselves.

IInd Level Training—3 Days
Resource Centre (R.C.) Representatives Training

Objectives

- To empower representative from each resource centre to conduct monthly trainings for "Tarang."
- To orient the participants to the concepts, activities and experiences under "Tarang."
- To develop skills and competencies of the R.C. representatives to conduct the trainees.
- To monitor the programme implementation by the 1st standard teachers.

Administrative and Logistic Support

All the R C training took place in the respective district at a convenient taluka headquarter The entire three day training was organised by the DPEO's and administrative staff at the district level The DRT members trained a group of 30 to 35 participants in one or two groups simultaneously, depending on the total participants ECD-LRC team members, UNICEF and GCERT representatives participated and monitored each of the training in all the 8 districts.

Feedback

A feedback from the participants from almost all training programmes has been that no careful or conscious selection of trainees has been made by the District Primary Education Officers Sometimes the trainees are from the same Taluka or just picked up a day before and asked to report for the training While the participants expressed the usefulness of the programme, they expressed the need for some prior preparation which they felt would equip them better to internalise the training.

From our own experience of good, innovative teachers from the districts, their attendance in the trainings are rare. hence only 30 per cent of trainess have actually been selected by the DPEO.

Training Strategy Content

As mentioned earlier the DRT as well as R C trainings emphasised the participatory approach. Activities and games were demonstrated by involving all the trainees in each activity The DRT members were given the freedom to plan the content of the training programme and in majority of the Districts content was planned as per the tentative guidelines provided by ECD-LRC, i e., games and activities were demonstrated for each of the three subject areas during each of the three days In a few districts the DRT members thought it more convenient to give week/month-wise training. Songs, story and material preparation sessions were incorporated in all the trainings. Each trainee was provided with a monthwise schdule of activities and experiences which would simplify and facilitate their roles as R C. trainers. This was in addition to the other "Tarang"materials provided during the training.

Monitoring

In order to systematically monitor the progress of "Tarang" the following structure was used.

(a) *School Level*

At the beginning of 1995 academic year the age data of all new entrance was collected

The attendance of all students is being monitored and recorded on a daily basis In case of an absence the concerned teacher visits the house of the child and talks to the parents to persuade them and ensure that the students attend school regularly. Once in two threeee months a *"vali sammelan"* (parent-teacher meeting) is held to appraise the parents of any problems related to their children All schools maintain a record of these meetings

(b) Taluka Level/Resource Centres

Every month teachers of classes I and II have been meeting at their respective Resource Centres. The activities undertaken at the RCs are as follows:

- Lesson planning
- Activities to be undertaken (games, stories, songs and group activities)
- Teaching aids to be prepared
- Teaching demonstration and problems related to content and subject

A brief report of the activities undertaken at the RCs is being sent to UNICEF and GCERT from some of the RCs Records of the same are being kept at the RCs which can be seen during the course of field visits. Assistant District Educational Inspectors (ADEIs) and MLL trainers are usually present at these meelings. UNICEF has also participated in these meetings.

(c) District Level

Attempts have been made to orient and get a feedback from the ADEIs at the monthly meeting which all DPEOs conduct when ADRIs come to the district for the collection of salaries. The other actions undertaken are:

1 Situation of attendance rate of the district
2. Status of follow-up actions inTaluka reporting less than 80 per cent attendance rate.
3. Progress of continuous training at Resource Centres.

The DPEO compiles the district attendance data and sends the same to the State quarterly.

(d) State Level

Quarterly meeting of DPEOs are held by the Director, Primary Education to monitor progress of "Tarang "

An orientation workshop was held for the chairmen of the District Education Committees for orienting them to "Tarang" and their expected role. Basic programme to be monitored was explained and follow-up to these meetings will be held on a quarterly basis

Achievement Levels

Having been convinced by the encouraging impact of MLL on the qualitative improvement in project schools, the State Government proposed to introduce MLL in classes I and II in all primary schools of Gujarat from June 1996

In the course of the field visits, certain important issues have been noticed which would actually interfere in the ahievement of competencies They are as follows:

(1) Pedagogic
(2) Classroom arrangement –
(3) Daily scheduling of subjects
(4) Monitoring of competencies
(5) Evaluation results.

These have been taken up in the course of recurrent training of teachers and individually at Resource Centres. GCERT has been appraised of the situation and some of these issues were taken up at the steering committee meeting held in the presence of Dr. Ravindra Dave. All our efforts are being directed in helping teachers to overcome the basic pedagogic issues.

While classroom monitoring is been done, on a sample basis we have been collecting achievement data from each of the districts of students of class I. Competencies related to recognition and verbal ability seems to be poorer than written competencies.

At the end of the academic year an Assessment of Basic Competencies study would be initiated in cooperation with GCERT and ECD/LRC to assess the achievement of children of classes I and II.

TARANG—SOME FIELD EXPERIENCES

- "Tarang" served as a pedagogy for 1st grade teachers as it increased clarity and equipped teachers with wide range of activities and experiences that enabled them to and (a) have flexibility in executing, (b) gave scope to interweave sub-culture specific folklore stories, songs and games.

- A holistic planning and management approach advocated through "Tarang" has facilitated the process of implementation, making learning evironments vibrant and children friendly This approach has therefore played a major role in improving school effectiveness through concrete "hand on"experiences
- Tarang has been advocating on learning competence of children rather the mere performance as the goal. It has been able to blend MLL based content of the textbook with a wide range of pedagogical considerations in reaching out to children across the state The pedagogies of "Tarang" being concrete and specific and with continuous on the job training of teacher as an in built component has left relatively lesser scope for operationalizing the competency-based joyful learning programme in the classroom.
- The strategies designed in "Tarang" leave adequate scope for implementing the programme in the shcool courtyards as well and limitation of space within the school building does not necessarily interfere with the programme.
- "Tarang" offers specially designed low cost teaching-learning materials (which are field tested prototype resources in the urban, rural and tribal belts by ECD-LRC, HDFS Department, M S. University of Baroda). "Tarang" also encourages the use of indigenous locally available resources in and around the school environment
- "Tamang " has les to more meaningful interaction among teachers due to fortnightly training-cum-feedback sessions at specially initiated resource centres. This has encouraged sharing of ideas, improvising strategies by learning lessons from other teachers' demonstrations and discussions
- "Tarang" has made a beginning with the district as the centre of planning and the district education administrater serves as a key member of the monitoring team. District planning has enabled the adminstrative machienery to view the "Tarang"programme as its "own" project and has been able to involve local resources for capacity building and execution of the programme such that it reflects the ground level realities.
- Tarang has been able to create healthy competition between district-level authorities, supervisors of urban and rural school boards, resource centre coordinators and the most vital members of the team the first grade teachers.
- "Tarang" like any large scale programme with implications on policy formulation shares few concerns such as

- ★ since multi-level people and agencies are involved in implementation, the process of creating a dent has been rather gradual yet progressive in scope.
- ★ the programme has been conceived by people involved at the policy level and hence it is rather too challenging to operationalise in an intergrated manner, inspite of frequent meetings, training sessions to clarify roles of individuals at different cadres across the state
- ★ since the pre-service training of teachers at pre-P.T.C. and P.T.C and B Ed. level lacks essential Child Development knowledge base, the receptivity of teachers and supervisors is rather low This requires recurrent training and monitoring.
- ★ due to multilevel training network, though rigorous in terms of pedagogy, is likely to dilute the efficacy of training and classroom practices to an extent. But the approach being (a) participatory at all levels; (b) ready to use curriculum package with manual of guidelines for teachres, and the low cost yet essential learning resources made aviailable to each school of Gujarat (rural, tribal, urban belts); (c) clearly defined procedure for monitoring of teachers, supervisors, and trainees; (d) access to continuous training to all the first grade teachers at the local resource centres, entire machinery has been geared up to reach out more effectively to children.

- "Tarang" provides adequate scope for downward as well as upward extension of the classroom programme Hence the package is such that it could get absorbed into the total system of pre-primary and primary education.

CONCLUSION

The pedagogy of "Tarang" is time tested and has evolved out of two decades of action research at the Department of HDFS, M S. University, Baroda. Howerver, for the first time it has gone on scale when Government of Gujarat indicated interest in introducing "Tarang " package into the primary school system. It is interesting to note that "Tarang" has spread ripples all over the state The timing is apt since the DPEP project and the MLL programme are in operation. Rather than expansion and merely meeting the target this three fold action is indicative of the concern of the Government for improving the quality of Early Primary Education Finally, "Tarang" is a movement for advocating the principles and practices of early child development through a concrete plan of action and by networking with UNICEF, GCERT, Department of Education, and local NGOs the Government has initiated the process to meet the ultimate aim of universalising primary education and enhancing the quality of education for all.

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Numeracy and Reading Readiness Levels of Entrants to Class I

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The study identifies (a) reading readiness and numeracy readiness levels of entrants to class I, (b) components of readiness which need stengthening, (c) relationship between environmental factors and readiness levels, (d) relationship between readiness levels of entrants to class I and teachers rating on child's social maturity, and (e) to provide feedback to curriculum planners and textbook writers. Twenty-seven MCD schools from nine zones and ten public schools from four regions of Delhi were selected randomly Total sample size consisted of 217 children Tools developed to assess school readiness for reading and numeracy were used. Data on social readiness of the child was also collected through observation of the child The data was analysed to assess the impact of background factors on reading and numeracy readiness levels of children,

Results indicate that vast majority of children lack adquate levels of readiness for reading and number work at the time of entry to school. It is, therefore, essential to plan activities and materials to enhance readiness levels of children before formal learning takes place in class I Enriching experiences are especially needed in the areas of audio-visual association, auditory discriminatio, visual perception and vocabulary development to promote reading readiness.

In the area of numeracy readiness poor performance was shown with regard to sequential thinking, seriation, space concepts and pre-number concepts Children with preschool experience had better readiness levels Academic readiness was also found to be highly related to physical, psychomotor and socio-emotional state of development of children

Enhancing school readiness of children, preschool programme for all children and preparing textbooks to help children acquire specific skills for improving reading and numeracy readiness levels would help in improving the learning achievement of children at the primary stage

INTRODUCTION

One of the major national initiatives for achieving the cherished goal of improving and universalising the quality of primary education has been the launching of District Primary Education Programme (DPEP) The baseline studies conducted by NCERT during the initial and preparatory phase of DPEP indicated poor learning ahievement of children in primary grades, specially in the areas of reading and mathematics. For instance, the findings reveals that 47.6 per cent of the students in class II in Panna district of Madhya Pradesh could not read even a single letter correctly. The same was true for one-third of pupils in Nanded in Maharashtra, Sirsa in Haryana and Karbianlong in Assam. Similarly in the case of recognition of single digits, simple addition and subtraction the average were exeedingly low (NCERT, 1994), While analysing the causes for such a poor learning achievement the significant factors found associated were the difficulty levels of textbooks, comprehensibility of language used in textbooks, teachers related factors, class size, teacher-pupil ratio, attendance, preschool experience and other environmental factors.

One of the important considerations to enhance learning achievement of children would be designing curriculum contents based on average readiness of the child for the tasks expected from him/her in a particular grade. For grade I the readiness level of a child is positively correlated with his/her preschool experiences. However, the access to and the quality of preschooling vary signficantly from one part to another. Not only this, the chronological age as criterion for school entry has variations from one state to another Therefore, the study of identifying numeracy and reading readiness levels of entrants to class I has been conceived in the context of DPEP strategy for improving the quality of learning in the areas of reading and mathematics by designing curriculum and learning materials based on acquired levels of readiness and needs of children.

CONCEPT OF SCHOOL READINESS

School readiness could be defined as the child's attainment to enable him to fulfill school requirements and to assimilate curriculum contents. The dual characteristic of this definition refers to the child himself, on the one hand, to the school and its requirements on the other.

There are different views regarding the concept of school readiness. One version of readiness concept states that children become ready for formal leaning at different times as a result of maturation. Gessel Institute of Child Development on the basis of their work suggested a developmental placement programme for children, i.e., starting school on the basis of behavioural age rather than chronological age or intellectual age They maintained that behaviour develops in a patterned predictable way and any child needs to have reached a certain level of maturity before she/he will be ready for the work of the grade. It holds that training of pre-school experience do not speed up growth (Frances & Louise, 1978). Another view holds that the real initiative for active learning comes from child and it bears no relation with maturational concept of readiness

It holds that pre-school experience bears immense significance to speed up growth. It cautions that to relax and wait for maturation, when there are many concepts and skills to be developed, would appear to be deliberately reatarding the child

School readiness could be defined in terms of child's personal social readiness, academic readiness and readiness for co-curricular activities Our purpose is to focus on reading and numeracy readiness of children which are parts of readiness for 3 R's, i.e., acdemic readiness

For beginning reading the child needs to have developed various skills. Some of the key elements of reading readiness are good control over oral language, development of perceptual skills, auditory skills, skills of audio-visual association and directional behaviour The elements of reading readiness are developed during the transition period extending several months. Each of these elements involves number of skills. For example, visual discrimination is impossible without recognition and comparison. For reading, therefore, the child needs to recognise and discriminate adequately between symbols (alphabets) and build sound association for cluster of letters, with direction behaviour under control It has been found that children who learn to read slowly have poor language skills (auditory discrimination of sounds, words and sentences) and visual analysis of shapes The new entrants to school must therefore confine preschool free scanning behaviour to particular directional behaviour

For number readiness of children the basic skills and concepts necessary are conceptualising basic quantitative features of sets of objects and understanding the relation between these sets, developing concept of equivalence and non-equivalence and order relation including seriation, skills of matching, counting, classification and sequential thinking.

SCHOOL READINESS AND SCHOOL SUCCESS

Behaviour inventories used by Gesell Institute of Child Development found that a child who is to be dressed, fed and forced on to school bus is not ready for school. An unready child finds it difficult to take part in a group. A child who objects to go to school indicates a prime sign of his/her unreadiness It is assumed that 50 per cent school failure can be prevented if placement of child in school is done according to behaviour age rather than chronological or intellectual age. Problem of failure arises when children are over placed and unready for school. These inventories therefore advised teachers to note whether children know the names of body parts, know left from right, identify colors and shapes by name, can cooperate and participate in group activities, can walk on balancing beams, etc. Teachers are also advised to look for problems in such activities like holding a pencil, pasting, shoe tieing as well as note that which children reverse letters and numbers It was presumed that children experiencing difficulties in such areas are likely to have problem in mastering Primary School Curriculum. But most of these warning signs have not been found to have significant correlation with school failure and are thus ineffective (Simner 1983). The effective warning signs evident among kindergarten children who were at risk for school failure were (Simner 1983):

1. In-class attention span, memory span
2. In-class verbal fluency
3. In-class interest and participation
4. Letter or number identification skills
5. Printing errors.

Okon and Okon (1973) using the test to evaluate readiness in terms of intellectual development in 6 and 7 years old children and its influence upon school success found that significant correlation exist between school readiness and school success Items in the test included recognising objects, sets and symbols as based on differentiation, comparison classification, formation of elementary mathematical concepts and copying symbols with varying degree of abstraction The findings also revealed strong influence of environment on readiness levels of children. Significant differences were found between rural and urban children (r bis = .35). Age was also significantly associated (r bis = .265), for extreme groups of 6 years and 7 years. Sex was not found associated significantly.

However, on a few items girls did perform better than boys. Preschool experience was found significantly associated (r bis =.17) for rural children, where as there was no significant association for urban children.

OBJECTIVES OF THE STUDY

Objectives of the study were:

- To identify reading iness levels of class I.
- To identify numer idiness levels of entrants to class I.
- To identify those c ients of readiness which need strengthening
- To establish relati between environmental factors and readiness levels

- To establish relationship between readiness levels of entrants to class I and the teacher's rating on child's social maturity.
- To provide feedback to curriculum planners and textbook writers

RESEARCH QUESTIONS

In accordance with the objectives of the study, answers to following questions were sought.

- What are the reading and numeracy readiness levels of entrants to class I?
- What are the various components of readings and numeracy readiness which need strengthening?
- What are those environmental and background variables which are significantly associated with reading and numeracy readiness levels?
- Does social readiness (social maturity) of children contribute to reading and numeracy levels?

METHDOLOGY

The present study was undertaken by the Department of Preschool and Elementary Education (DPSEE) simultaneously with four regional studies in four states, viz , Haryana, Madhya Pradesh, Karnataka and Assam undertaken by respective Regional Institutes of Education (RIEs) under the DPEP programme. The common design discussed and finalised for the DPEP studies in four states was applicable to this study as well The information pertaining to sampling, tools, data collection, scoring and analysis is given below.

Sampling Method

The method used in selecting school was random. From the zone-wise list of schools 27 MCD schools were selected from nine zones 10 public schools were selected randomly from four regions of Delhi, i.e. East, West, North and South. From each selected school 5 to 10 children were selected randomly from each school depending upon the strength of children in grade I. The sample characteristics were as below

(a) Sample size	MCD Children = 217 Public School = 80
(b) Gender composition	Girls = 194, Boys = 103

(c) Age composition

Below 5 yrs. = 21
5 to 5 yrs. 6 months = 161
5 yrs 6 months to 6 yrs = 64
above 6 yrs. = 51

(d) Sample according to preschool experiences

	Public School	*MCD Children*	*Total*
With preschool experience	59	62	121
Without preschool experience	21	155	176

(e) Parental Education Level

	Illiterate	*Primary*	*Middle*	*Sr. Sec.*	*Graduate & P. G.*	*No response*
Mother's	141	43	14	33	25	41
Father's	56	68	30	45	50	41

(f) Mother Tongue: 96 per cent Hindi as mother tongue.

Tool's Construction

Tool's construction was done in the Department of Preschool and Elementary Education. Tools used by Prof. R. Muralidharn (NCERT) in the study of Temple children in Andhra Pradesh 1992 (and tools constructed for school readiness by her and associates in 1973) were taken as the basis to select the suitable items for the tool's construction. Some of the items were similar but some more items were included in the tool as per the dimension of the present study.

Tryout and Finalisation of Tool

Items developed for each dimension were tried out in seven Anganwadis among 21 children in Delhi. Difficulty level and discrimination index were calculated. Too difficult or too easy items were either deleted or modified to have moderate difficulty level. The tried out data were presented before the Advisory Committee meeting and discussed. Originally the study was planned to test AW children who were likely to enter class I. But the study could be launched only in the month of July when children already had entered the school in April. It was therefore proposed to have few items included for number knowledge and words identification.

TABLE 1
Readiness Test· Components and Their Sub-component

1. Reading readiness			*2 Numeracy Readiness*		
Components		*No of Items*	*Components*		*No of Items*
1.1	Vocabulary	12	2 1	Pre number Components	14
1 1.1	Sentence Comprehension	4	2 1.1	Concepts of size, length, height, thickness, width, quantity and distance along with their seriation	one item each
1 1 2	Action Pictures	4			
1 1 3	Community helpers	4			
1.2	Visual Perception	8			
1 2 1	Visual Matching	4	2 2	Space Concepts (Concept of position)	7
1 2 2	Visual Discrimination	4	2 3	Classification	3
1 3	Auditory Discrimination	4	2 4	Sequential thinking	3
1 3 1	Initial sound	4			
1.3 2	Sound Discrimination	4	2 5	Part-whole Relationship	4
1 4	Audio Visual Association	3	2 6	Number knowledge items	4
1 5	Words Identification	4			
Social Maturity (No of items) = 6		Min. Marks		Max Marks	
Rating scale = 3 point scale		6		18	

Reliability

The reliability coefficient of the tool based on test-retest method was calculated to be 0.71. Retest was conducted on 32 children after a gap of 2 months

Validity

Content validity was established on the basis of experts opinion.

RESPONSE SHEETS

Scoring sheet was developed for recording responses of children on each item. In addition to scoring of reading readiness items (35) and numeracy readiness items (35) the scoring sheet also included information about child's background Six items were also framed to get data, on the basis of general observation of the child, about the social readiness of the child. These items were framed on three point rating scale resulting in a composite score varying from 6-18 for each child.

DATA COLLECTION

Data collection was carried out in MCD schools with the help of Supervisors of Education Department, Delhi Administration. An orientation of the field staff was organised on data collection and administration of tools. Practical experience of tools administration was given to each supervisor involved in data collection. Administration of tool was to be done individually for each child. Administering the tool took nearly 30 minutes for each child. In a day, data collection from nearly 4-5 children was expected. Thus, 10 supervisors were employed to complete the data collection within 7 working days. Data collection from Public School was done by the project staff in the department.

ANALYSIS

Data were subjected to following analysis:

(i) Frequency distribution for each dimension and subcomponent for total sample and across groups.
(ii) Significance of difference between means on different dimensions and sub-components across groups
(iii) Significance of difference between means on different dimensions vis-a-vis age
(iv) Multiple regression analysis between Readiness scores, as dependent variable. Age, Social Maturity and Fathers' and Mothers' education as predictors.

RESULTS AND DISCUSSION

Results of the study have been presented in terms of attainment level of children in the areas of reading and numeracy readiness The levels of attainment in different components and sub-components of reading and numeracy readiness have also been presented for MCD and Public School children separately.

The data have also been analysed to assess the impact of background factors on the reading and numeracy readiness levels of children. The background or environmental factors analysed include preschool experience if children, age and parental education An attempt has also been made to correlate the social maturity (index) of child with his/her reading and numeracy readiness levels

READINESS LEVELS OF CHILDREN ENTERING CLASS I

To ensure smooth transition from home/preschool to primary school, it is necessary to base the early primary grades' curriculum on the readiness levels demonstrated by children. It will not only provide an effective learning continuum for young learners but will also help them adjust to primary school environment The readiness levels of children in reading and numeracy are presented as follows

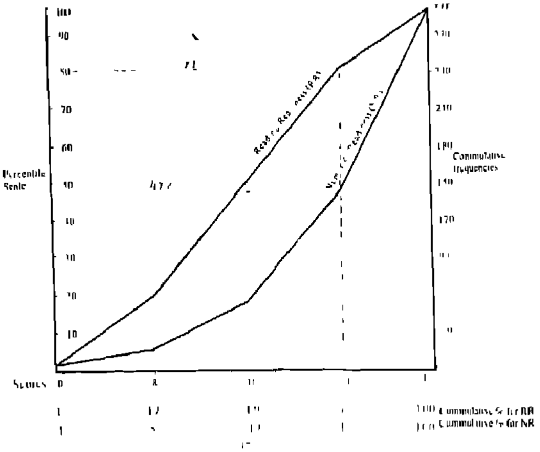

Figure 1 Cumulative percentage curve of 297 scores on RR and NR

Reading Readiness Levels

Reading readiness levels of children are presented in Table 2

TABLE 2

Reading Readiness Levels of Children with Cumulative Percentage Frequencies Mean and S.D.

Marks	*Frequency*	*Cumulative f*	*Cumulative % f*
25-31	61	297	100
17-24	90	236	79
9-16	96	146	49
1-8	48	50	17
0	2	2	01

N = 297
Mean = 16 90
S.D = 7 96

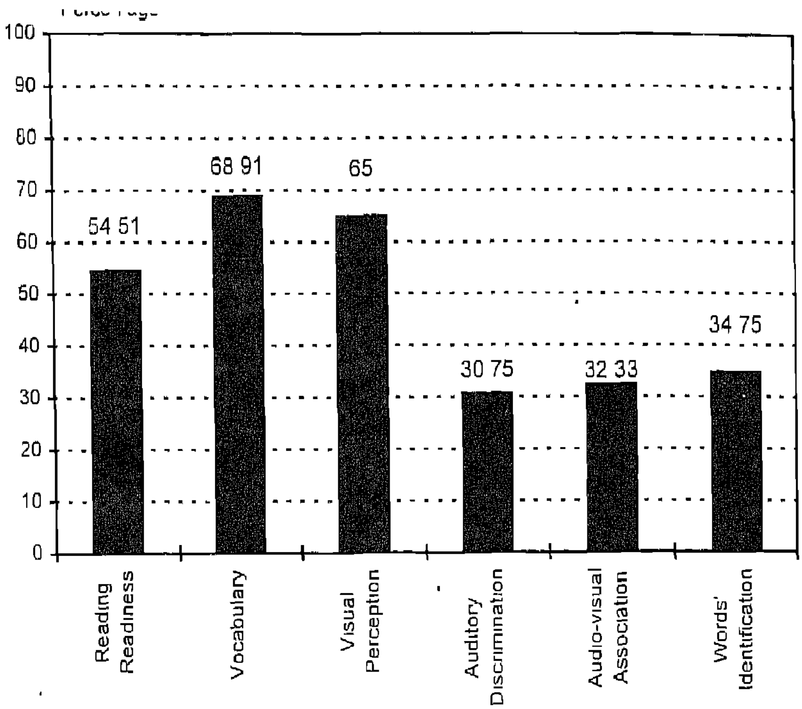

Figure 2 Reading readiness levels in terms of % mean score

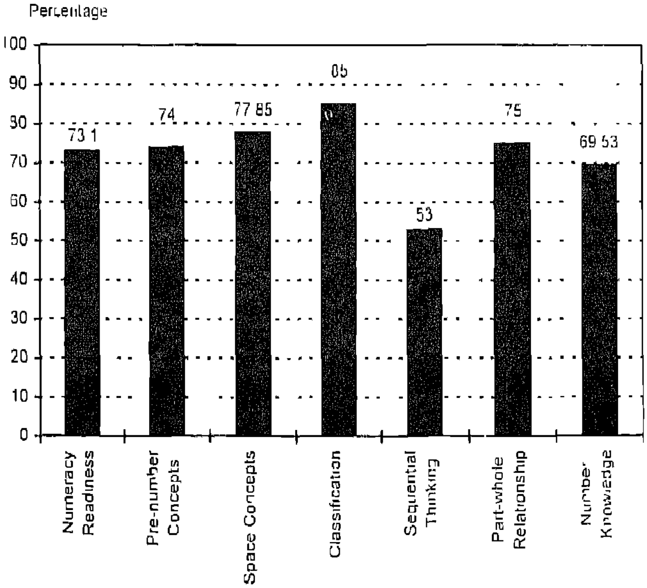

Figure 3 Numeracy readiness levels in terms of % mean score

The mean value of 16.90 if converted to per cent mean score, comes to be 54 51 Thus the per cent mean performance of children is 54.51. However, it will also be of interest to us to know that what percentage of children have achieved the level of 75 per cent mark or above (under minimum levels of learning the suggested level is 80 per cent mark) We find that only 21 per cent children have achieved this mark. Rest 79 per cent children are below 75 per cent achievement level (i.e., the score of 25) It can also be read from Table 2 that 17 per cent children are unable even to cross 25 per cent achievement mark (i.e., the score of 8). These children have a very poor performance and therefore could be termed as unready for school Sixty-two per cent children fall between 25 to 75 per cent achievement mark (see Table 2 and Figure 1). These children would also require further efforts to reach the level of 75 per cent mark and above.

Numeracy Readiness Levels

Numeracy readiness levels of children are presented in Table 3.

TABLE 3
Numeracy Readiness Levels of Children with Cumulative Per Cent Frequencies, Mean and S.D.

Marks	*f*	*Cumulative f*	*Cumulative %f*
25-31	157	297	100
17-24	83	140	47
9-16	41	57	19
1-8	13	16	05
0	3	3	01

N = 297
Mean = 22.85
S D. = 7.41

It is evident from Table 3 that 53 per cent children have attained a score of 25 or above (i.e. above 75 per cent mark). Only 5 per cent have scored a score of 8 or less than 8 (i e. below 25 per cent mark). There are 44 per cent children which fall between 25 to 75 per cent attainment level. The percentage mean performance of children in numeracy readiness is 73.70 as compared to 54 51 in reading readiness.

The higher performance of children in numeracy readiness could be explained partially by the fact that there is less interference of linguistic variations in numeracy tasks and partially with the findings mentioned elsewhere that most of the children having rural background get greater opportunities to have concrete experiences related to quantitative features of objects.

The comparative performance of children in numeracy and reading readiness is shown with the help of Figure 1, i.e , the ogives plotted for numeracy readiness and reading readiness. It is evident that children have scored consistently higher in numeracy readiness than reading readiness as the curve for numeracy readiness is placed on the right hand side.

Reading Readiness Components Which Need Strengthening

Figure 2 presents children's reading readiness levels in terms of percentage mean score for all component of reading readiness, separately and taken together It is evident that auditory discrimination, audio-visual association and words identification (alphabets recognition) are the components which would need strengthening. Word identification items were excluded from the total reading readiness score. However separate analysis for this component was carried out as it has been found to be a good indicator of school success. In components of visual perception and vocabulary upto 20 per cent children have shown poor performance hence some input in these two components would also be necessary alongwith major input regarding components of auditory discrimination, audio-visual association and alphabets recognition

TABLE 4
Sub Components of Pre-number, Space and Part-whole Concepts
(Figures showing % of Correct Answers)

Pre-number Concept	*Seriation*	*Space Concept*	*Part-whole Concept*
Big-Small 92	69	In Out 93	Full 94
Long-Short 92	69	On-Under 93	Half 76
Tall-Short 88	69	From Behind 81	Less than 67 half
Far-Near 69	51	Full Empty 91	More than 62 half
Up-Down 84	60	First Last 76	
Thick-Thin 89	69	Right-left 64	
Less-More 75	56	Right-Left (double command) 46	

Numeracy Readiness Components Which Need strengthening

Figure 3 presents the readiness levels of children in different numeracy

TABLE 5

Showing Cumulative Percentage Frequencies of MCD and Public School Children on Reading Readiness and its Components

		Public school N = 80			*M C D School N = 217*		
	Marks Range	*f*	*cum f*	*cum % f*	*f*	*cum f*	*cum %*
1.	25-31	44	80	100	17	217	100
	4-24	23	36	46	59	200	92
	9-16	12	13	16	91	141	65
	1-8	1	1	1	48	50	23
	0	-	-	-	2	2	1
1 1	10-12	60	80	100	74	217	100
	7-9	13	20	25	65	143	66
	4-6	7	7	9	58	78	16
	1-3	-	-	-	20	20	9
	0	-	-	-	-	-	-
1 2	7-8	62	80	100	52	217	100
	5-6	15	18	22	59	165	76
	3-4	3	3	4	46	106	49
	1-2	-	-	-	30	60	28
	0	-	-	-	30	30	14
1.3	7-8	32	80	100	15	217	100
	5-6	16	48	60	17	202	93
	3-4	9	32	40	22	185	85
	1-2	3	23	29	57	163	75
	0	20	20	25	106	106	49
1 4	3	41	80	100	30	217	100
	2	5	39	48	20	187	86
	1	5	34	42	22	167	77
	0	29	29	36	145	145	67

1. Reading Readiness
1.1 Vocabulary
1.2 Visual perception
1 3 Auditory Discrimination
1 4 Audio Visual perception

components, separately and taken together, in terms of percentage mean score. Children's performance is lowest in sequential thinking followed by number knowledge, pre-number concepts, part-whole concepts, space concepts and the classification. Substantial number of children would need input in these components to reach satisfactory levels of readiness.

It is evident from the above analysis that under pre-number concepts the concepts of far-near and less-more have appeared comparatively difficult for the children. In seriation tasks children had difficulty almost in all the 7 concepts analysed. Under space concepts the most difficult item was. left-right orientation. Under part-whole concept children had greater difficulty in recognising more than half and less than half task items.

IMPACT OF BACKGROUND FACTORS

Data were analysed to assess the impact of background variables, i.e, rural/urban background (MCD/Public School Children), preschool experience (children with preschool experience and without preschool experience) and age. The significance of difference between means were analysed by calculating *t* values. The data were also subjected to regression analysis for background variables of fathers' educational level, mothers' educational level, age of children and social maturity score as per the rating by the teachers The results are shown in Table 5.

TABLE 6

Children Scoring above 75 Per Cent Mark in Reading Readiness and its Components

	Public School Children %	*MCD Children* %
Reading Readiness	54	8
Vocabulary	75	38
Visual Perception	78	24
Auditory Discrimination	40	7
Audio Visual Association	52	14

SCHOOL BACKGROUND OF CHILDREN

From Table 5 it is clear that there are great differences between MCD and Public School children's performance in reading readiness as a whole and components of reading readiness separately. There are 54 per cent Public School children against 8 per cent MCD children scoring a score of 25 or above (i.e, above 75 per cent marks). Similarly there are 75 per cent Public

TABLE 7

Showing Cumulative Percentage Frequencies of Public School and MCD School Children on Numeracy Readiness and its Items

		Public School Children N = 80			*M.C.D Children N = 217*		
	Marks Range	*f*	*Cum f*	*Cum % f*	*f*	*Cum f*	*Cum %*
2	25-31	59	80	100	98	217	100
	17-24	16	21	26	65	119	55
	9-16	05	05	06	39	54	25
	1-8	-	-	-	13	16	07
	0	-	-	-	02	02	01
2.1	12-24	62	80	100	96	217	100
	8-11	10	18	23	48	121	56
	4-7	07	8	10	54	73	34
	1-3	-	01	01	15	19	09
	0	01	01	01	04	04	02
2.2	6-7	59	80	100	102	217	100
	4-5	20	21	26	74	115	53
	2-3	01	01	01	30	41	19
	1	-	-	-	02	11	05
	0	-	-	-	09	09	04
2.3	3	73	80	100	148	217	100
	2	04	07	09	39	69	32
	1	01	03	04	15	30	14
	0	02	02	03	15	15	07
2.4	3	33	80	100	54	217	100
	2	27	47	59	48	163	75
	1	12	20	25	46	115	53
	0	08	08	10	69	69	32
2.5	4	42	80	100	130	217	100
	3	12	38	47	22	81	40
	2	7	26	32	26	65	30
	1	17	19	23	24	35	18
	0	02	02	02	15	15	07

2.	Numeracy readiness total score	2.3	Classification
2.1	Pre-number concepts	2.4	Sequential thinking
2.2	Space concepts	2.5	Part-whole relationship

School children against 34 per cent MCD school children who have scored above 75 per cent marks in vocabulary score. These figures are 78 per cent for Public School and 24 per cent for MCD school children for visual perception 40 per cent and 7 per cent for auditory discrimination, 52 per cent and 14 per cent for audio visual association. These figures are summarised in Table 6.

Table 6 shows the extent of difference between Public School children and M.C.D children. M C.D children fared badly in comparison to Public School children

The results for numeracy readiness show similar trend as in reading readiness, i e., the differences between Public School and MCD School children are marked ones. Seventy-four per cent Public School children scored a mark of 75 per cent or above against 45 per cent MCD School children scoring the same mark in numeracy readiness The differences between Public School and MCD children are similar for components of numeracy readiness, i.e., pre-number concepts, space concepts, classification and sequential thinking except part-whole relationship. The percentages of children scoring the mark of 75 per cent or above in these above components are shown for Public School and MCD school children in Table 8.

TABLE 8

Percentage of Children Scoring a Mark of 75 Per Cent or Above in Numeracy Readiness and its Component

	Public School Children %	*MCD School Children* %
Numeracy Readiness	74	45
Pre-number Concepts	77	44
Space Concepts	74	47
Classification	91	68
Sequential Thinking	41	25
Part-whole Concept	53	60

Public School children have scored consistently higher in all components of numeracy readiness except part-whole relationship. The higher score of MCD children in part-whole relationship may be due to children of MCD schools getting greater opportunities for practical experience of part-whole concept related objects/activities in their day-to-day life in comparison to Public School children

The difference in performance of MCD and Public School children has been tested statistically by using "t" test. The differences are significant at 01 level for reading readiness and its components and numeracy readiness and its component except the part-whole concept, as evident from Table 9

Public School sample, alongwith MCD school children, was taken in the present study with a specific purpose to gauge the levels of readiness which children can achieve given the best of available facilities and environment. The results obtained from the above comparison of MCD and Public School children clearly indicate that much needs to be done in this direction for children coming from deprived background This can be done by providing meaningful context to children for learning at entering class I and giving opportunities to master those skills in which they have fared badly. The context should be non-threatening, action-based, interesting and child-centred

TABLE 9
Significance of Difference on Reading and Numeracy Readiness and Their Components for MCD and Public School Children

	Reading Readiness				*Numeracy Readiness*			
Group	*Dimension*	*Mean*	*SD*	*t value*	*Dimension*	*Mean*	*S D.*	*t value*
Public	1	23.78	6 24	**	2	26 48	4 62	**
MCD		14.36	6 97	10 61		21.51	7.78	5.35
Public	1.1	9 11	2 19	**	2 1	12.51	2 69	**
MCD		5.70	2.18	4 94		9.58	3.98	6 09
Public	1.2	7 25	1.21	**	2 2	6 23	1 04	**
MCD		4 34	2 61	9 62		5.17	1.83	4.49
Public	1 3	4 64	3.12	**	2 3	2.85	.55	**
MCD		1.66	2.99	8.97		2 46	91	3 58
Public	1 4	1 73	1 41	**	2 4	2 06	91	**
MCD		76	1 11	6 58		1 41	1 18	4 41
					2 5	2 84	1 34	-1 31
						3 06	1 33	

** p < .01

IMPACT OF PRESCHOOL EXPERIENCE

The data have been analysed comparing children who have preschool experience and children without preschool experience. The results have been presented in terms of significance of difference between means by computing "t" values as given in Table 10. We find the children having preschool experience have higher mean scores than those who do not have preschool experience, in both the areas, i e., reading readiness and numeracy readiness and their components and sub-components.

TABLE 10

Significance of Difference between Means of ECE (Pre-School) and Non-ECE Children for Reading Readiness

		ECE Children N = 121		*Non-ECE Children N = 176*		
Dimensions		*Mean*	S D.	*Mean*	S D	*t value*
1	Reading Readiness	20.49	8 42	14 43	6 6	6.94**
1.1	Vocabulary	9.51	2.46	7 62	2.92	5 56**
1.1.1	Sentence Comprehension	2.94	94	2 63	99	2 65**
1 1 1	Action Picture	3.52	80	2.97	1.12	4 63"
1.1.3.	Community Helpers	3 05	1.51	2 02	1.68	5.44"
1 2	Visual Perception	5 98	2 65	4 53	2 49	4 82"
1.2.1	Visual Matching	3.19	1 35	2 59	1.44	3 65"
1 2.2	Visual Discrimination	2 79	1 48	1 94	1 46	4 91"
1.3	Auditory Discrimination	3 74	3.17	1 59	2 24	6 84"
1 3 1	Initial Sound Recognition	2 14	1 84	85	1 39	6 86"
1.3.2	Sound Discrimination	1.60	1 50	76	1 14	5 47"
1 4	Audio Visual Association	1.39	1.40	69	1.11	4.81"
1 5	Word Identification (Alphabet recognition)	2.00	1 62	96	1.16	6.44'

** p< .01

"t" values show that there are significant differences at .01 level in all components and sub-components of reading readiness between children having ECE experience and children without ECE experience. Children having preschool experience have shown higher performance in all areas in comparison to those children who are coming without any preschool experience.

TABLE 11

Significance of Difference Between Means of ECE and Non-ECE Children for Numeracy Readiness

Dimensions		*ECE Children N=121*		*Non-ECE Children N=176*		
		Mean	*S D.*	*Mean*	*S D*	*t value*
2.	Numeracy Readiness	25 39	6 41	21 10	7 56	5.10**
2.1	Pre-number Concepts	11.82	3.37	9 38	3.94	5 57**
2 2	Space Concepts	5 86	1 55	5.17	1 78	3 46**
2 3	Classification	2 71	71	2 47	92	2 47**
2 4	Sequential Thinking	1.94	1 07	1.34	1 17	4 51**
2 5	Part-Whole Concept	3 19	1.23	2 87	1 37	2 07*
2.6	Number Knowledge	3 10	1.37	2 55	1 30	4 75**

** < 01 * < .05

It is evident from Table 11 that there are significant differences between ECE and non-ECE children in all components of numeracy readiness. The differences are significant at 01 level except in part-whole concept where the difference is siginificant at .05 level. The differences are in favour of ECE experienced children.

READING AND NUMERACY READINESS VIS-A-VIS AGE OF CHILDREN

An attempt was made to study the reading and numeracy readiness levels of children of different age groups Three age groups of children were compared. First group comprised of children upto the age of 60 months (5Yrs.), second group comprised of children between 61 to 66 months and third group comprised of children above 66 months. The mean values, SDs and significance of difference between means of three groups are presented through Table 12

TABLE 12

Significance of Difference Between Means of Different Age Groups for Reading Readiness

Age of Months	*Group*	*N*	*Mean*	*S D*	*t values*
Up to 6	1	5	14 06	6 98	I vs II 2 79**
61-66	2	117	17 40	8 12	I vs III 3 31**
67 and above	3	115	17 99	7 99	II vs III 75**

** $p < 01$

Table 12 indicates that there exists a significant difference between groups I and II and between groups I and III. But there exists no significant difference between groups II and III, in reading readiness

TABLE 13

Significance of Difference Between Means of Different Age Groups on Numeracy Readiness

Age in months	*Group*	*n*	*Mean*	*S D*	*t values*	
Up to 60 months	1	65	22 02	6 88	I vs II	1 12
61-66	II	117	22.85	7 39	I vs III	.56
67 and above	III	115	23 31	7 23	II vs III	46

It is evident from Table 13 that there is no significant difference between means of different age groups of children in numeracy readiness

Impact of Social Maturity Age, and Parental Education on Reading and Numeracy Readiness

The role of care giving adults and surrounding environment is crucial for child's allround development. Child's personal, social, mental, physical and language development is largely shaped by the quality of interaction with his/her, environment An attempt was made to gauge the impact of environmental factors and age on child's readiness levels in reading and numeracy. The mothers' educational level, fathers' educational level and the index on social maturity (as per the rating by the teacher) were considered The data were subjected to multiple regression analysis and the results obtained are summarised in Table 14.

Table 14 indicates that social maturity and mothers' educational level contribute significantly to reading readiness. Together, they are responsible for 48 per cent of variance in reading readiness scores Social maturity alone

TABLE 14
Variable/s Contributing Significantly to Variance in Reading and Numeracy Readiness (N=297)

S No	Dimension	Variable	R2	Significance level
1	Reading Readiness	Social Maturity	0 32	01
		Social Maturity & Mothers' education	0 48	01
2	Numeracy Readiness	Social Maturity	0 27	01
		Social Maturity & Mothers' education	0.32	01

contributes 32 per cent of variance and thus, emerges as a stronger variable for reading readiness

Children's age and father's education showed no significant relationship with reading readiness of entrants to class I

The results become more pertinent in light of the fact that 47 per cent of sample children's mothers were illiterate

Results were more or less similar for numeracy readiness with social maturity being the stronger predictor of readiness R2 = 0 27.

Data were again subjected to multiple regression taking ECE as an intervening variable. The results for the two groups of pupils (with and without ECE) are summarised in Table 15

TABLE 15
Variable Contributing Significantly to Variance in Reading and Numeracy Readiness for Pupils with ECE Experience

Group	Dimension	Variables	R2	Significance level
ECE	Reading Readiness	Mothers' education	0 27	.01
		Mothers' education Social maturity	0 50	01
	Numeracy Readiness	Social maturity	0.20	.01
Non ECE	Reading Readiness	Social maturity	0.40	.01
	Numeracy Readiness	Social maturity	0 30	01

Results indicate that in the absence of ECE as an intervening variable social maturity alone was a significant contributor to variance in reading readiness (40 per cent) and numeracy readiness (30 per cent).

For pupils with ECE experience mothers' education emerged as strongest (27 per cent) and significant factor for reading readiness It appears that educated mothers consciously expose their children to such learning experiences.

Mothers' education and social-maturity together were responsible for 50 per cent of variance in reading readiness scores

For numeracy readiness social maturity emerged as factor contributing significantly (20 per cent) to the variance

Overall, it can be said, the social maturity and mothers' education contribute to the academic readiness of pupils more than the age and fathers' education Social maturity in itself is the outcome of various intervening and interacting variables in the child's environment and underlines the importance of a stimulating environment.

CONCLUSIONS AND SUGGESTIONS

For creating an environment of active learning right from the beginning of schooling it is essential that learning experiences of children are built upon the already acquired levels of school readiness of entrants to class I. The knowledge about the average readiness levels of children in the area of reading and numeracy is therefore necessary not only for curriculum planners and textbook writers but also for teachers, teacher educators and administrators Guidelines emerged from the study for textbook writers in particular and teachers, teacher educators and administrators in general are as follows:

1. Vast majority of children lack adequate levels of readiness for reading and number work at the time of entry to school It is therefore essential to plan activities and materials to enhance readiness levels of children before formal learning take place in class I

2. In the area of reading readiness the levels acquired by children, as indicated by the results, are dismal with regard to audio-visual association, auditory discrimination and visual perception. It would be imperative to provide the children experiences for developing required readiness skills in these areas before children actually begin reading. In order to give enriching experience to children in these skills various activities should find proper weightage in the preschool and class instructional materials.

3. With regard to vocabulary, though the achievement of children is comparatively better, but at the same time it is also true that substantial number of children have failed to respond correctly to simple sentence comprehension items and picture identification items. Emphasis on promoting children's vocabulary is important in the context of reading comprehension. Activities for development of children's vocabulary should find prominent place while designing textbooks.

4. In the area of numeracy readiness the results show very poor performance specially with regard to the sequential thinking, seriation, space concepts and per-number concepts. Children lacking in these skills would need to gain experiences through suitably designed activities and materials before they take on formal arithmetic tasks.

5 The study reveals that there are substantial number of children less than 5 years of age who are admitted to class I Similarly there are many children who have crossed 7 years of age when admitted to class I The age range thus is from less than 5 to 7 years This variation in children's age obviously makes the composition of class more heterogenous. If the situation continues to remain like this it would place heavy demand on curriculum writer to exercise flexibility in terms of contents, methods and materials so that all children could assimilate curriculum contents.

6. Preschool experiences have put children in an advantageous position with regard to readiness levels. It is imperative to have preschool methodology extended to class I It is also suggested that as an interim measure preschool experiences be provided through a condensed course of school readiness programme at the beginning of the session, since it would greatly help children

7. The environmental factors have shown great relevance to readiness levels of children Mothers' education has emerged as one of the most crucial factor Preparation of educational plans to compensate for this disadvantageous position of children due to low level of parents' education is a challenge for personnel engaged in developing instructional materials and planning instructional strategies.

8. There is high correlation between children's readiness levels for reading and number work and their social maturity scores based on teachers' ratings. It implies that the academic readiness for reading and arithmetic is not in isolation with children's physical, psychomotor and socio-emotional state of development. It is therefore essential to pay attention to children's socio-emotional needs in order to achieve desired levels of readiness among children. The self-concept and emotional balance of children will contribute significantly towards the readiness of children for schooling.

IMPLICATIONS

1. Providing opportunities for preschool education to all children.

2. Organising school readiness programmes for those children who enter class I without any preschool experience

3 In textbooks preparation for class I there should be ample provision to practise those skills in which children have performed poorly, i. e., auditory skills, audio-visual association, left right orientation and visual per-

ception for reading readiness and sequential thinking, seriation activities and pre-number concepts for numeracy readiness.

4 There is a need that the elements of school readiness are included in the teacher training programmes both pre-service and inservice

RECOMMENDATIONS FOR FUTURE STUDIES

1 In order to have more realistic data to show school success of children in relation to levels of readiness at the time of school entry there is a need to conduct longitudinal studies. Children's learning achievement in Ist grade through five would have to be correlated with school readiness levels

2. In the context of requirement of Minimum Levels of Learning at primary level it would be highly desirable to relate the mastery of competencies at primary stage with the mastery of school readiness skills

3. The benefits of school readiness programme of two to three months duration at the beginning of class I for those children who enter school directly from home need to be assessed in relation to their school success, i.e , increase in learning achievement.

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Parents and Teachers Perceptions of Gender Related Issues for Improving Access, Enrolment, Retention and Achievement of Girls at Primary Stage

Gauri Srivastava

The study examines the view point of parents and teachers on gender and gender related issues Two co-educational schools from South Delhi were selected for conducting the Pilot Study. From each school ten teachers and ten parents of children were selected. Information was collected through questionnaires followed by in-depth interview The data were manually processed for qualitative analysis.

Results indicate that access, enrolment and retention of girls in primary schools can be significantly improved if (a) parents and teachers have positive attitude regarding gender and gender related issues, (b) non-discriminations is followed between boys and girls in teaching-learning process, extra curricular activities, sitting arrangement, appointment of monitors, etc, (c) parents treat both sons and daughters equally, and (d) simultaneously socio-economic and educational backgrounds of parents are improved through social and economic interventions.

The concern for girls' education has received a lot of importance from policy planners and educationalists The National Policy on Education 1986 and the POA mentions that "...the removal of women's illiteracy and obstacles inhibiting their access to, and retention in, elementary education will receive over-riding priority"[1] Further, there is a realisation that the goal of EFA will be distanced if this section of humanity is ignored.

Numerous studies conducted by the Department of Women's Studies, (UNESCO sponsored Innovative Project on Universalisation of Primary

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[1] The author gratefully acknowledge the help received from Prof. Kuldip Kumar and Dr Raj Rani

Education of Girls and Disadvantaged Groups in Rural Areas in Haryana, 1989-94, Study of Continuance and Discontinuance of Girls in Elementary Schooling in Rajasthan, Delhi, Bombay and Orissa, 1991-92, The District Primary Education Programme· Gender Studies in Eight States of Assam, Haryana, M P, Maharashtra, Karnataka, Kerala, Tamilnadu and Orissa 1993-95) clearly point out that factors related to household, school and community significantly influence access, enrolment and retention of girls in school.

Nearly all the above mentioned studies point out that the reasons for the continuance of girls in school is because of some of the following positive factors:

Household

- Better economic standing of the household
- Parental education
- Parental motivation
- Creating space and time for studies at home
- Provision of academic support
- Self motivation of the girl child.

School

- Existence of women teachers
- Positive attitude of teachers towards girls
- Existence of physical facilities in schools.

The above mentioned studies also pointed out that if any of the above mentioned factors relating to the household and the school is missing it may lead to discontinuance of girls in school at the initial or primary stage of education

This study aims at finding out how both parents and teachers together can play a crucial role in encouraging girls' education.

The study has the following objective.

- To understand the view points of parents and teachers on gender and gender related issues.

METHODOLOGY

The sample for the study has been selected by adopting purposive sampling techinque Two co-educational schools from South Delhi (one central and one public) were selected for conducting pilot study. From each school ten teachers were randomly selected. Ten parents of children studying in the same school were interviewed Information was collected through questionnaires followed by in-depth interview of selected parents and teachers The issues examined are as follows:

- with teachers regarding gender bias in textbooks, in teaching and learning process and in extra co-curricular activities.
- with parents regarding visible and invisible discrimination practised in the area of food, health and education of the girl child.
- the role of PTM to understand gender issues and their role in promoting girls' education

The data so obtained was manually processed through qualitative analysis.

MAJOR FINDINGS

In South Delhi the socio-economic status of twenty women teachers and parents of two co-educational schools, i.e., Kendriya Vidyalaya, NCERT and Air Force Golden Jubilee Institute have been discussed in Section I and II. Section I, is devoted, to the discussion on perception of teachers on gender and gender related issues for improving access, enrolment and retention and achievement of girls in the above mentioned schools at the primary stage. Section II of the paper gives the finding of parents of the two schools on the above mentioned issues.

Section I

The Socio-Economic and Educational Status of Women Teachers of AFGJI and KV, NCERT

Women teachers of both the schools belonged to Hindu religion.

TABLE 1

Marital Status of Women Teachers of AFGJI and KVS

Sl No.	Marital Status	AFGJI*	KV**	Total No. of Teachers (%)
1.	Unmarried	-	2	2 (10%)
2	Married	10	8	18 (90%)
3.	Divorced	-	-	-
	Total (N) = 20	10	10	20

Table 1 shows that 90 per cent women teachers in both the schools were married

* Air Force Golden Jubilee Institute
**Kendriya Vidyalaya, NCERT, New Delhi

TABLE 2
The Age of Women Teachers in AFGJI And KV

Sl No.	*Age Group*	*AFGJI*	*KV*	*Total No of Women*
1.	20-25	-	1	1 (5%)
2.	25-30	_	2	2 (10%)
3.	30-35	1	3	4 (20%)
4	35-40	5	-	5 (25%)
5.	40-45	3	1	4 (20%)
6.	45-50	1	3	4 (20%)
Total (N) = 20		10	10	20

Most of the women teachers in both the schools, i.e. 25 per cent were between the age group 35-40 years.

TABLE 3
Annual Income of the Household of Women Teachers of AFGJI and KV

Sl. No.	*Annual Income*	*AFGJI (1)*	*KV (2)*	*Total Percentage (1 & 2)*
1	40,000-50,000	2	-	2 (10%)
2.	50,000-1 Lakh	3	1	4 (20%)
3.	1 Lakh & above	5	4	9 45%)
4.	No Response	-	5	5 (25%)
Total (N) = 20		10	10	20

Table 3 show that 45 per cent women teachers had an annual income of more than a lakh of rupees. This depicts that the economic standing of the household was fairly good.

TABLE 4
Professional Qualification of Women Teachers

Sl No	*Professional Qualification*	*Teachers of AFGJI (+1)*	*Teachers of KV*	*Total NO.and Percentage*
1.	B ED.	9	10	19(95%)
2.	M ED.	-	-	-
3.	Ph D	-	-	-
4.	Others	1		1 (5%)
Total (N)=20		10	10	20

TABLE 5
Teaching Experience of Women Teachers

Sl. No	*Length of Teachers*	*AFGJI*	*KV*	*Total No and Percentage*
1	Below 5 Years	2	1	3 (15%)
2.	5-10 Years	3	3	6 (30%)
3.	10-20 Years	4	3	7 (35%)
4.	20-30 Years	1	2	3 (15%)
5	30-40 Years			
6	No Response		1	1 (5%)
Total (N) = 20		10	10	20

Nearly 35 per cent women teachers had a teaching experience of ten to twenty years followed by 30 per cent who had experience ranging from 5 to 10 years.

Therefore, women teachers in both the schools (AFGJI and KV) came from fairly good socio-economic and educational backgrounds.

Perceptions of Women Teachers on Gender and Gender Related Issues

In both the co-educational schools in classes I to V the following subjects were taught by women teachers to both boys and girls.

English, Hindi, Maths, Environmental Studies, Drawing

In Kendriya Vidyalaya, NCERT, the curriculum also included SUPW, i.e., (Socially Useful Productive Work)

Most of the teachers mentioned that the textbooks used in the above mentioned classes were free from gender bias and stereotyping in language, illustration and examples were used. Only three out of twenty teachers mentioned that there was gender bias. The above mentioned view of the teachers were supported by discussions held with them.

In the classrooms all women teachers mentioned that they made boys and girls sit together.

Women teachers of Air Force Golden Jubilee Institute mentioned that boys and girls are equally participating in the class. Both of them were also very articulate.

In Kendriya Vidyalaya, NCERT the perception of women teachers was slightly different Interestingly out of ten teachers seven teachers mentioned that girls were participating more than the boys in the class and were also articulate. Only three teachers stated that boys were participating in classroom activities.

The above observation is supported by discussions held with women teachers. They further stated that they consciously encouraged girls particularly those who were shy in class to come forward and participate.

Regarding slow learners most of the women teachers of KV and AFGJI mentioned that they took the following steps that were common to both boys and girls for their overall academic improvement

- Gave extra attention in class, after class and also sometime during the activity period.
- Changed the sitting arrangements of students by making the slow learners sit with those students who were performing well.
- Constantly motivating them by appreciating their work, using encouraging words and promising them rewards
- Giving copies of students who were performing well in the class.
- Trying to probe and find out causes that affect their performance.
- Keeping in touch with parents.
- Resorting to remedial teaching

TABLE 6

Roles Assigned to Students in Dramatics in AFGJI and KV

Sl.	*Roles*	*AFJGI*		*KV*		*Total No. and Percentage*	
		Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
1.	Male Character	2	-	6	-	8 (40%)	-
2.	Female Character	-	2	-	4	-	6 (30%)
3	Common to Both	3	3	-	-	3 (15%)	3 (15%)
4	Any Roles	-	-	2	4	2 (10%)	4 (20%)
5	Not Specific	2	2	2	2	4 (20%)	4 (20%)
6.	No Response	3	3	-	-	3 (15%)	3 (15%)
Total (N) = 20		10		10		20	

Most of the women teachers of the two co-educational schools, i e , 30 per cent assigned girls roles that are generally related to female characters. Twenty per cent teachers stated that they assigned any kind of roles depending on the play Further few mentioned that there were no specific roles assigned to girls.

Regarding boys 40 per cent stated they assigned roles that were related to male characters. Twenty per cent teachers were of the opinion that there was no specific roles given to boys. Fifteen per cent mentioned that roles were common to both boys and girls.

TABLE 7
Values Imparted by Women Teachers in Both Schools (AFGJI and KV)

Sl	*Roles*	*AFJGI*		*KV*		*Total No and Percentage*	
		Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
1.	Obedience	10	10	10	10	20 (100%)	20 (100%)
2.	Tolerance	10	10	10	10	20 (100%)	20 (100%)
3	Soft Spoken	10	10	10	10	20 (100%)	20 (100%)
4	Caring for the old & Sick	10	10	10	10	20 (100%)	20 (100%)
5.	Religious Tolerance	10	10	10	10	20 (100%)	20 (100%)
6	Truthful--ness	10	10	10	10	20 (100%)	20 (100%)
7.	Cleanliness	10	10	10	10	20 (100%)	20 (100%)
8.	Non-Violent Behavior	10	10	10	10	20 (100%)	20 (100%)
9	Respecting Elders	10	10	10	10	20 (100%)	20 (100%)
Total (N) = 20		10		10		20	

All the teachers, i.e., 100 per cent mentioned that they imparted similar kind of values to both boys and girls

TABLE 8
The Choice of hobbies for Boys and Girls as Expressed by Women Teachers
Of AFGJI and KV

Sl	*Roles*	*AFJGI*		*KV*		*Total No and Percentage*	
		Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
1.	Reading	2	2	4	5	6 (30%)	7 (35%)
2	Creative Writing	-	-	1	-	1 (5%)	-
3.	Drawing and Painting	3	3	3	6	6 (30%)	9 (45%)
4.	Needle Work	-	1	-	2	-	3 (15%)
5.	Stamp Collection & Painting	2	1	6	2	8 (40%)	3 15%)
6.	Making small handicraft items	-	-	-	2	-	2 (10%)
7.	Music	3	4	1	3	4 (20%)	7 (35%)
8.	Dance	2	3	1	2	3 (15%)	5 (25%)
9.	Gardening	-	-	4	-	4 (20%)	-
10	Outdoor Games	9	6	6	6	15 (75%)	12 (60%)
Total (N) = 20		10		10		20	

Interesting most of the women teachers of the two schools encouraged both boys and girls to take outdoor games as hobby.

TABLE 9
Professional Aspiration of Teachers for their Students (AFGJI and KV)

Sl.	Roles	AFJGI		KV		Total No and Percentage	
		Boys	Girls	Boys	Girls	Boys	Girls
1	Teachers	—	4	2	7	2 (10%)	11 (55%)
2	Doctors	1	2	5	5	6 (30%)	7 (35%)
3.	Engineers	3	1	7	13	10 (50%)	14 (70%)
4.	C.A.	1	1	3	1	4 (20%)	2 (10%)
5	Business Executive	—	—	5	2	5 (25%)	2 (10%)
6	Any Govt Job	1	2	3	2	4 (20%)	4 (20%)
7.	Armed Forces	1	—	4	3	5 (25%)	2 (10%)
8.	Pilots	1	1	1	—	2 (10%)	1 (5%)
9.	Banking	—	—	—	1	—	1 (5%)
10	Nurse	—	—	1	—	—	1 (5%)
11	Lawyer	—	—	1	2	1 (5%)	2 (10%)
12	Police	—	—	2	2	2 (10%)	2 (10%)
13	According to Interest	3	2	—	—	2 (10%)	2 (10%)
14	Any other	—	—	2	6	2 (10%)	6 (30%)
15	Not Specific	3	3	1	1	4	4
Total (N) = 20						(20%)	(20%)

Table 9 shows that the teachers of both the schools aspire the following profession for boys

- Engineering
- Doctor
- Business Executive
- Armed Forces

For girls the preference is for

- Engineering
- Teachers
- Doctors
- Any other

This shows that as far as choice of profession is concerned there is no bias amongst the teachers. From the primary stage they want both boys and girls to take up professions that are nearly similar for both sexes.

The discussion held with headmistress and teachers of AFGJI and KV points out that none of the girls dropped out from schools at the primary stage in the last five years This shows that both the schools are working towards achieving the goal of universalisation of Primary Education(UPE). It also reflects that the school environment is positive and the attitude of the teachers is extremely encouraging.

Perceptions of Teachers regarding Parent Teacher Meeting

All the women teachers interviewed from Kendriya Vidyalaya and Air Force Golden Jubilee Institute agreed that Parent Teacher Meeting (PTM) discussed:

- Academic performance of the child.
- His/her behaviour with teachers and peer group.

Significantly there was an overall consensus regarding widening the scope of the above to areas relating to *gender and gender issues, value conflicts and generation gap*. The teachres felt that a closer interaction between parents and teachers on these broad areas will help in the overall development of child personality, reduced any kind of anomic situations faced by them in such an impressionable stage of development. The following suggestions were made by the teachers, i.e., holding debates on these issues both by parents and teachers, calling eminent persons working in the area of education, and child psychology and so on. Also, holding counselling session in schools for children.

Further, women teachers were of the opinion that in the long run the parent teacher meeting can further improve access, enrolment and retention of girls in primary school. They elaborated that if there is any kind of irritant regarding girls, education it can be discussed positively so that the goal of UPE is achieved.

Section II

The Socio economic and Educational Status of Parents of Air Force Golden Jubilee Institute and Kendriya Vidyalaya, NCERT

All the parents of the above mentioned school belonged to the Hindu religon and were married

In Kendriya Vidyalaya out of ten parents interviewed 9 were Class IV employees, and only one parent was Class III employee

In AFGJI ten parents interviewed were from a varied background, e.g., businessmen, educationalists, doctors and managers in hotels Four respondents, i.e , mothers did not do any kind of profession They were housewives

TABLE 10
Nature of Family

Sl. No	*Family*	*AFGJI**	*KV***	*Total No of Parents & (%)*
1	Nuclear	6	4	10 (50%)
2.	Joint	4	6	10 (50%)
Total (N)=20		10	10	20

Table 10 shows that 50 per cent families were nuclear and 50 per cent families were joint families in the two schools

TABLE 11
Educational Qualification of Parents of KV and AFGJI

Sl No	*Roles*	*KV*	*AFGJI*	*Total No and Percentage*
1	Hr. Secondary	6	—	6 (30%)
2	B A	3	4	7 (35%)
3	M A	—	1	1 (5%)
4	B A , B Ed.	—	—	—
5.	M A , B Ed	—	1	1 (5%)
6	B Sc	—	2	2 (10%)
7	M Sc	—	—	
8	M Phil	—	—	
9	Ph D	—	—	
10.	Any other	1	2	3 (15%)
Total (N) = 20		10	10	20

The above table shows that 35 per cent passed B A Degree followed by 30 per cent who were Higher Secondary pass and 15 per cent also had Ph.D. Degree.

Out of ten parents, seven parents of Kendriya Vidyalaya mentioned that their annual income was between Rs 25,000 to 50,000. Two parents had an income ranging from Rs 50,000 to One lakh rupees. Only one parent mentioned that he had an annual income of Rs 25,000.

Out of ten parents interviewed from AFGJI eight parents had an annual income of Rs. One lakh and above Two parents did not respond

TABLE 12

Values Imparted by Parents to their Daughters and Sons (AFGJI and KV

Sl	*Roles*	*KV*		*AFGJI*		*Total No and Percentage*	
		Son	*Daughter*	*Son*	*Daughter*	*Son*	*Daughter*
1.	Obedience	10	10	10	10	20 (100%)	20 (100%)
2	Respecting Elders	10	10	10	10	20 (100%)	20 (100%)
3	Tolerance	10	10	10	10	20 (100%)	20 (100%)
4	Soft Spoken	10	10	10	10	20 (100%)	20 (100%)
5	Caring for the Old and Sick	10	10	10	10	20 (100%)	20 (100%)
6.	Cleanliness	10	10	10	10	20 (100%)	20 (100%)
7.	Truthfulness	10	10	10	10	20 (100%)	20 (100%)
8.	Non-Violent Behaviour	10	10	10	10	20 (100%)	20 (100%)
9.	Religious Tolerance	10	10	10	10	20 (100%)	20 (100%)
Total (N) = 20		10		10		20	

Table 12 shows that similar values were imparted to both their sons and daughters by parents of both the schools

TABLE 13
Perception of Parents Regarding Profession they want their Sons and Daughters to be taken in future (AFGJI and KV)

I	*Profession*	*Parents of AFGJI*		*Parents of KV*		*Total No and Percentage*	
		Son	*Daughter*	*Son*	*Daughter*	*Son*	*Daughter*
1.	Teachers	—	1	2	3	1 (5%)	4 (20%)
2	Doctors	2	1	—	2	2 (10%)	3 (15%)
3	Engineers	1	1	1	—	2 (10%)	1 (5%)
4	Administrative Service	—	1	—	—	—	1 (5%)
5	Govt Service	—	—	1	1	1 (5%)	1 (5%)
6	Police Officer	—	—	—	1	—	1 (5%)
7	Armed forces	—	—	1	—	1 (5%)	
8	Lawyers	—	—	—	—	—	—
9	M.B A	1	1	—	—	1 (5%)	1 (5%)
10	Business	1	—	—	—	1 (5%)	
11.	C A.	1	1	—	—	1 (5%)	1 (5%)
12	Own Choice	1	1	—	—	1 (5%)	1 (5%)
13.	Same	1	1	1	1	2 (10%)	2 (10%)
14.	Not Specific	2	2	1	1	3 (15%)	3 (15%)

Total (N) = 20

Table 13 shows that the perception of parents for the profession they want their sons to take up in future is follows

- 15 per cent parents stated that they had no specific choice as far as profession of their son is concerned
- 10 per cent wanted their son to take up the profession of Doctor or Engineer.
- Some stated that they wanted any kind of profession for both their sons and daughters.

However, for their daughters they expressed their preference for teaching, i.e., 20 per cent and 15 per cent mentioned that they preferred them to be Doctors in future

Out of twently parents interviewed in both the schools fourteen parents mentioned that their daughter helped them in domestic chores Only six stated they were helped by both their daughters and sons

This depicts that most of the girls help their parents in domestic work However, this did not effect their education

Parents mentioned that there is no gender bias as far as investing money in education, clothes and toys of their daughters and sons are concerned.

Intrestingly parents of both schools did not practise any kind of social norms and practice that can have an adverse impact on their daughters, e.g., child marriage, purdah and dowry Only one parent of KV mentioned that child marriage was practised in their family.

Nearly all the twenty parents of AFGJI and KV were satisfied with the school and the teachers of primary classes. However, out of ten parents three parents of KV expressed their dissatisfaction with the method of teaching. This view is also supported by discussion held with parents.*

Interestingly all the twenty parents clearly stated that the school did not discriminate between their son and daughter in the following areas·

- Choice of hobbies
- Choice of monitors
- Participation in classroom activities
- In extra co-curricular activity

The above view is supported by group discussion held with parents who felt that their children were treated equally in all respects.

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*They wanted more home work for their children

TABLE 15
Parents Perception about roles assigned to their Sons and Daughters in School (KV and AFGJI)

Sl	Roles	KV		AFGJI		Total No. and Percentage	
		Son	Daughter	Son	Daughter	Son	Daughter
1	Male Character	1	1	4	—	5 (25%)	1 (5%)
2.	Female Character	—	4	—	6		10 (50%)
3.	Common to Both	2	2	4	3	6 (30%)	5 (25%)
4.	Any roles	—	1	—	—		1 (5%)
5	Not Specific	2	1	2	—	4 (20%)	1 (5%)
6.	No Response	4	2	2	1	6 (30%)	3 (15%)
Total (N) = 20		10		10		20	

Most of the parents of AFGJI and KV stated that the roles given to their daughters in dramas and plays are related purely to female characters and to their son it is related to male character. This shows that there is an element of bias and stereotyping. However, they also mentioned that common roles are sometimes given to their son and daughter

Perception of parents about the role of Parent Teacher Meeting

All the parents expressed that parent teacher meeting mainly discussed the following issues·

- Academic performance of children
- His/her behaviour with teachers and peer group.

Nearly all the parents agreed that Parent Teacher Meeting (PTM) should widen its scope and include discussion on gender and gender related issues, value conflict and generation gap.

The following suggestions were given by parents:

(a) Frequently holding parents teacher meeting
(b) Showing audio-visual and print media carrying positive messages on gender and gender related issues, prevalent social problems, problems related to maladjusted children

(c) Experts in the field of education, child psychology, gender and so on should be called.

(d) Debates can be organised between parents and teachers on the above mentioned area

All the twenty parents agreed that Parent Teacher meeting can help in increasing parents involvement in the school activities. Infact, through constant interaction between parents and teachers not only the school and home environment could improve but in the long run help in the healthy development of mind and body of the child. It can help in preventing problems of maladjusted children in the school

Lastly parents felt that Parent Teacher Meeting can help in achieving the goal of UPE (Universalisation of Primary Education).

CONCLUSION

The study clearly brings out that parents and teachers of the two schools i e. (Central and Public) had a very positive attitude regarding gender and gender related issues Interestingly the teachers did not practise any kind of discrimination between boys and girls in the teaching and learning process. This is also evident in the extra co-curricular activities. Further, the teachers mentioned that in the organization of class i.e. sitting arrangements, appointment of monitors, arranging the classroom etc. equal treatment was given to both the sexes.

They further expressed their views that textbooks used at the primary stage i.e I to V classes were free from gender bias and stereotyping.

All women teachers mentioned that they treated slow learner boys and girls equally They constantly tried to encourage them and motivate them so that their overall performance in the class improves.

The attitude of parents of both the schools was also positive. They treated their sons and daughters equally.

Significantly all parents agreed that they did not observe any social norms and practices that can have a derogatory impact on their daughters They firmly mentioned that they did not believe in child marriage, purdah, and dowry system. They further added that if there was a monetary windfall in the family they would like to equally invest in the education, clothes and toys for their sons and daughters.

Nearly all the parents mentioned that domestic work was done by their daughters. However, it did not have an impact on their education. Very few mentioned that even their sons helped them.

Perhaps this positive attitude of parents and teachers can be explained from their relatively good socio-economic and educational backgrounds. Also, both of them were highly motivated and educationally aware.

Significantly parents and teachers felt that the scope of parent teacher meeting should widen and should extend beyond academic discussion to gender and gender related issues, value conflicts and generation gap which has a direct bearing on access, enrolment, retention and achievement of the girl child in particular They further added that by widening the scope of Parent Teacher Meeting (PTM) the goal of Universalisation of Primary Education can be achieved. This is also supported by discussions held with them.

The investigators feel that if the study is extended in future to rural areas or schools located in urban slums where Parent Teacher Meetings (PTM) are not held some kind of difference in the attitude of parents and teachers can be found.

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Action Research at Primary Stage by Primary Teachers

NCERT Experience

Action Research for Quality Improvement in Learning Achievement at Primary Stage

D. K. Bhattacharjee and Kuldip Kumar

INTRODUCTION

An experiment was undertaken in 1995 by the Primary Teachers of Schools in four Regional Institutes of Education (RIE) of the NCERT to try out competency-based teaching-learning strategies to ensure that every student achieve minimum levels of learning at the end of the designed interventions. Teachers were oriented in the action research approach to tackle day-to-day teaching-learning problems in classroom situations. The teachers were provided academic guidance by the Dean (Instruction) of the RIE and Headmaster of the School. Initial orientation in competency-based action research approach to teaching-learning was organised for the teachers. Concurrent on-line assessement of progress in the execution of designed experimental interventions was monitored every week by the in-charge of Primary Section and Headmaster of the School, every month through written reports which were processed centrally, and once in two to three months through an Appraisal Mission Mode by a team comprising of the Joint Director, NCERT, Head of Department of Educational Research and Policy Perspectives, Principal and Dean Instruction of the RIE. After six months a conference of participating teachers was organised for sharing and learning from others' experiences.

This account of the experiment provides procedural details and achievements after six months of the commencement of the experiment. The aim is to provide a framework for teachers in primary school, especially under the District Primary Education Programme, to adapt or adopt the action-research approach to resolve classroom teaching-learning problems at their level, with their own initiative and with available resources,

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The authors worked as facilitators in the Experiment The experimenters included the primary teachers in Demonstration Schools, the faculty of the RIEs and the DPSEE. They are grateful to the Joint Director, NCERT for encouragement and support with support and guidance from the Head Teacher, Cluster or Block Resource Centre Coordinator and Faculty of the District Institute of Education and Training.

EMPOWERMENT OF PRIMARY TEACHERS

It is becoming increasingly clear that it is the work of teachers that determines student outcomes. The vision of Stenhouse (1984)* that "it is the teacher who, in the end, will change the world of the school by understanding it," and the analysis of findings of recently conducted Learning Achievement Survey in states in India covered under the District Primary Education Programme in the first Phase (DPEP I) strengthen the view that the teacher needs professional empowerment for enhancing the quality of teaching-learning process in schools. The NCERT experiment is a step in the direction of empowering primary school teachers with the action research approach to interpret their own teaching and to attune it to the learning needs of students to ensure that every student achieves minimum levels of learning.

TRAINING INPUTS

During the summer vacation of 1995 the primary school teachers of NCERT Demonstration School attached to Regional Institutes of Education were provided a three-week orientation in the competency-based teaching-learning strategy They were acquainted with (i) the child-centred, activity-based, minimum levels of learning approach to teaching, (ii) the application of continuous and comprehensive assessment of student learning to evaluate on-line effectiveness of teaching, (iii) designing, formulating and implementing remedial instructional strategies for those students who might not achieve expected level of learning in the first cycle of teaching and (iv) systematically documenting the teacher inputs for the learner and the corresponding learning achievement from time to time.

IMPLEMENTATION STRATEGY

At the end of the three-week orientation of primary teachers, various operational aspects of competency-based teaching-learning programme, to be conducted in the schools in the RIEs, were conceptualised. In consultation with Headmasters of Schools it was decided that the practice of half-yearly and annual examinations would be dispensed with. The shape of the primary classroom would be changed to ensure the rquirements of activity-based joyful learning approach to teaching and the participation of the children. It was also decided that each school would constitute a team of teachers under the leadership of in-charge of primary section for formulating and implementing the need-based teaching-learning activities and their monitoring. The following tasks were entrusted to the team:

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* Stenhouse, L. Artistry and teaching· The teacher as focus of research and development. In Hopkins. D. and Wideen, M (eds) *Alternative Perspectives of School Improvemnt*, Lewes· Falmer Press (1984)

- Developing teaching-learning strategies and the instructional materials to be used during the teaching and working out instructional hours for each teaching unit with a view to communicate the same to the classroom teacher.
- Preparing in advance two sets of diagnostic tests for each of the teaching unit, one set to be used on completion of the unit and the second set to be utilised for assessing the effect of remedial teaching.
- Analysing the performance of children on diagnostic tests and identifying "masters" and "non-masters" in relation to that unit. Also grouping non-masters in different categories based on different kinds of major shortcomings in learning.
- Preparing remedial programmes in the light of major shortcomings identified by the teachers through diagnostic tests and making the remedial programme available to classroom teachers for use in the class.
- Preparing a proforma entitled "Performance Record" for the use of classroom teachers.
- Keeping liaison with the RIE facutly for cooperation, consultation and guidance in implementing the experiment.

READINGS FOR COMPETENCY-BASED TEACHING

To ensure learners' readiness to learn from the competency-based teaching planned by the teachers, students were first assessed for the competencies which are the prerequisites for teaching the next set of higher level competencies. The assessment activity was conducted in the first months of the academic session in July 1995.

MONITORING MEETINGS

The first review meeting was organised with the teachers in August 1995 to assess the status of implementation of the planned teaching interventions. The feedback provided by the teachers pointed out that one-fourth to half of class I students were "not ready" for the designed competency-based teaching strategy, and the number of students "not ready" was much larger in higher classes. It was also reported by teachers that there was a parental resistance to the new approach which involved assessment in the very beginning of the academic session and no "home work," which used to be the practice earlier.

REVISED STRATEGY

Taking into account the feedback received from the teachers, further action to implement the earlier designed teaching strategy was revised. The foucs of competency-based teaching was confined to class 1 in the first instance. The in-charge of Primary Section and the Headmaster were advised to convene a meeting of parents of class 1 students to share with them the new approach to teaching-learning that was being adopted in the school and to remove their apprehensions, if any about the pedagogical soundness of the new approach. Dean Instruction and Principal of the Regional Institute of Education were requested to extend all possible academic support to primary teachers, especially the class 1 teachers in resolving problems encountered by the primary teachers from time to time. In consultation with the teachers it was decided to keep Saturdays as non-teaching days for class I students and to utilise this time for discussions and planning of teaching strategies for the coming week by the teachers.

The second review of progress of implementing the competency-based teaching was organised in the last week of November 1995. The teachers freely expressed their difficulties which were discussed in the presence of the Headmaster, the Principal and Dean RIE, and the Joint Director NCERT. As an outcome of the review meeting the following decisions were taken to make the implementation of the programme more effective:

1. The effort made towards competency-based teaching would be further strengthened and sustained in future.
2. There would be one teacher for each section of a class. She would handle all subjects except language. Necessary changes would be made in the timetable accordingly.
3. Parents would be further oriented in the philosophy of competency-based teaching and evaluation. Senior faculty members of RIEs would take part in such an orientation programme.
4. No homework would be given in primary section and all assignments related tasks would be done in the class only. Home support would be minimised and school's effort in learning would be maximised.
5. Activity Bank would be developed for incorporating the activities appropriately in the MLL based child-centred and activity-based approach to teaching.
6. Continuous and Comprehensive Evaluation would be introduced in all classes A comprehensive Report Card would be developed

in consultation with the teachers and the RIE faculty for reporting the performance of students to parents.

7. On every Saturday teachers of class I would review various issues related to competency-based teaching and learning in the meeting and find solutions to problems. The students of class I would not attend the school on Saturdays.
8. The Department of Education of the Regional Institute of Education would take steps to orient all school teachers in the Action Research Methodology.
9. The concept of competency-based teaching would be extended to all primary classes by making internal adjustments in timetable from the next academic session.
10. A Paediatrician would be engaged for medical examination of all students of the primary section and a Health Card would be prepared for each student.
11. The data generated through competency-based teaching would be analysed and findings would be disseminated

SHARING OF EXPERIENCES

In December 1995 a four-day conference of primary teachers of all the four of Demonstration Schools engaged in the experiment was organised to enable every participating teacher to exchange views with others on the implementation of the competency-based action-research-approach to teaching, to share success stories with others and to benefit from the not-so-successful experiences of others. Experiences were presented through papers which were discussed in the seminar mode.

The problems taken up by classroom teachers in respective schools related to teaching of various subjects are reflected in the following titles:

DM School, Mysore

- Interesting methods of teaching Hindi to those whose mother tongue is not Hindi.
- Teaching of Kannada as first language.
- Teaching of English as second language.
- Teaching language skills through varied classroom activities
- Problems associated with implementation of competency-based teaching-learning strategies in mathematics.
- Child-centred, activity-oriented, competency-based teaching of environmental studies.

DM School, Bhubaneswar

- Competency-based teaching of Oriya as first language.
- Competency-based teaching of Mathematics.
- Competency-based teaching of Environmental Studies.

DM School, Bhopal

- Competency-based teaching of English as a second language.
- Competency-based teaching of mathematics.
- Competency-based teaching of environmental studies.

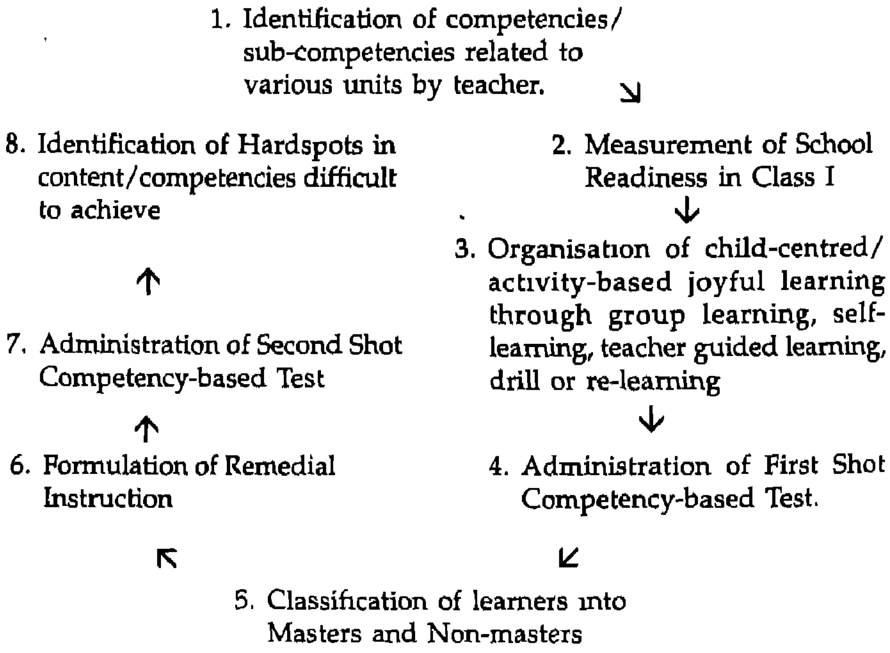
DM School, Ajmer

- Competency-based teaching of language.
- Competency-based teaching of environmental studies.
- Competency-based teaching of mathematics.

(Details of experimentation by teachers are given in the Report of the Conference of Primary Teachers of NCERT Demonstration Schools, held at the Regional Institute of Education, Mysore on 26-29 December 1995. The report is listed: Competency-based Teaching-Learning at Primary Level—Action Research Approach.)

INITIAL CONCEPTUAL MODEL OF COMPETENCY-BASED TEACHING

The conceptual model and sequence of activities followed by the primary teachers from July to December 1995 are reflected in the following flowchart.


1. Identification of competencies/ sub-competencies related to various units by teacher.
2. Measurement of School Readiness in Class I
3. Organisation of child-centred/ activity-based joyful learning through group learning, self-learning, teacher guided learning, drill or re-learning
4. Administration of First Shot Competency-based Test.
5. Classification of learners into Masters and Non-masters
6. Formulation of Remedial Instruction
7. Administration of Second Shot Competency-based Test
8. Identification of Hardspots in content/competencies difficult to achieve

FUTURE ACTION POINTS THAT EMERGED FROM THE EXPERIENCE GAINED FROM JULY TO DECEMBER 1995

Apart from subject-specific competencies there is a need to identify the competencies to be developed in children to meet the challenges generated by commercialisation of school education, shrinkage of job opportunities in government sector, parental and societal pressure built upon students to perform at the level of excellence in the face of cut-throat competition for entry into professional courses. What type of learning experiences are to be formulated to operationalise such competencies? How to encourage the skill of learning by doing—abilities of working with hands? How to encourage practical skills—skills in problem-solving and experimentation?

There is a need to identify competencies relevant to the ability, interest and motivation level of a particular age-group in order to make elementary education child-centred To facilitate necessary follow-up, the following actions were planned·

Special programme to be organised on

- Action Research Methodology
- Teacher-made competency test and their use to identify weakness of the students.
- Practical strategies to help non-masters.

Textbooks/workbooks/teacher guides to be revised to make them directly related to competencies expected to be achieved.

Record Card of the pupils reading in primary section of DM Schools to be altered and to be competency-based Evaluation to be continuous and comprehensive.,

The experiment on competency-based teaching to be readjusted in such a way that the model could be replicated/tailored as per the needs of average rural schools/disadvantaged schools.

The competency-based teaching strategy to incorporate enrichment programme for the gifted/masters as well alongwith remedial programmes for the non-masters.

The experiment to be extended to all classes in primary school (I to IV/V).

There is a need to identify multiple/alternative strategies to formulate modalities of teacher guided learning, child to child/group learning and self-learning activities.

There is a need for a continuous dialogue with the parents to sustain and to obtain support for the experimentation Parents are to be oriented in the philosophy of competency-based evaluation. Senior faculty members of the institute should take part in such orientation

There is a need for a deeper analysis to find out whether all learning could be competency-based.

Extension Department of RIE's to use the findings and experiments of the school teachers in formulating need-based programmes.

Efforts to be made to develop teaching aids/materials within the school system.

Case-study method to be adopted to tackle the problem of non-masters.

Competency-based teaching to be extended to non-cognitive areas like Health and Physical Education, SUPW and Art Education. Competency developed in these areas by NCERT to be sharpened and field tested.

All works related to implementation of competency-based teaching to be done within the school hours.

Remedial instruction cannot be provided by group learning, it is to be provided by teacher-guided learning and self-learning.

There is a need to analyse the reasons of non-mastery in a subject area through appropriate tools and techniques.

Remedial measure that could be adopted by teachers alongwith regular teaching work to be demonstrated by experienced faculty members.

There should be one teacher for each section of a class, she/he should handle all subjects except language. This is the common practice followed in most primary schools Therefore, necessary changes to be made in the time table accordingly.

Activity bank to be developed for incorporating the activities in the MLL based child-centred and activity-based approaches to teaching. The activities are to be developed through a "consultative culture" and are to be field tested.

On every Saturday the teacher of class I to review various issues related to competency-based teaching and learning in the meeting and to find solution to problems. The students of class I not to attend the school on Saturday.

The data generated through competency-based teaching in class I to be analysed and reported in International Conference through papers.

A special issue of the *Journal of Primary Teacher* to be published and it will incorporate articles presented in the conference.

The following revised conceptual model, based on the experiences gained during July to December 1995, is proposed for future action.

Conceptual Model of Competency-based Teaching in Primary Schools

10 Revision of MLL, Curriculum/ Textbooks/Workbooks/Teacher

1. Acquisition of knowledge/ awareness competency and

guides/Evaluation Procedures/
Teacher training strategy

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9. Identification of Hard spot in concept/competency areas.

↑

8. Measurement of Consequence competencies, i.e., students ability to demonstrate that he/she is able to perform the tasks as contemplated in MLL

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7. Enrichment lessons for Master Remedial Instruction for Partial Achievers/Non-masters.

↑

6. Classification of Learners into
   1 Masters
   2 Partial Achievers
   3. Non-Masters

↑

5 Diagnosis of Learner's difficulties/ disabilities through competency-based test/diagnostic tests.

↑

performance/competency by Primary Teachers through pre-service/in-service training.

↓

2. Assessment of Entry level learning behaviour of students in a subject.

↓

3. Reflection on/review of the nature of competencies related to unit/content areas.

↓

4. Formulation of Child-centred/ Activity-based/Joyful Teaching-learning in different subject areas through formulation of alternative strategies of:
   1 Teacher guided learning
   2. Group Learning/child-to-child learning/peer teaching
   3. Self-learning
   4. Drill/re-learning.

↓

Interventions

1. Teacher's ability to demonstrate the skill acquisition process to learners in different subjects.
2. Activity-based methods in different subjects.
3. Teaching skills and strategies
4. Handling of tools/techniques/learning aids.
5. Interactive communication strategies.
6 Classroom management strategies
7. Improvement in learning environment.

8 Teacher's ability to formulate competency-based/diagnostic tests
9. One teacher handling all classes except language.
10. Mode of obtaining parental support.
11. Consultative culture—Staff Meeting/ Meeting with experts.

Competency-based Teaching of Hindi—Evidences from Primary Classes

Uma Jorwal and D.R. Shrimali

An important feature of Minimum Level of Learning (MLL) in Hindi is that it aims at giving access to all children for education of a comparable standard Teaching under MLL is done on learner centred approach and it seeks maximum involvement of children with focus on competency-based classroom transaction The scheme of competency-based teaching in Hindi is being implemented in Demonstration School attached to Regional Institute of Education, Ajmer The paper intends to present salient features of the scheme It deals with important areas of teaching Hindi through competency-based interaction The problems and difficulties faced by the teachers in implementing the scheme and instructional strategies adapted to overcome them are placed on record The emerging concerns and issues related to non-masters are also highlighted The sample consists of learners from teaching grade I to V

INTRODUCTION

From the academic session 1995-96 the scheme of MLL in competency-based teaching of Hindi at teaching grades I to V (Primary stage) has been taken up. The stated objectives of language learning at Primary stage are as follows:

1. To make learner able to listen with understanding and to comprehend ideas through listening.
2. To make learner able to speak effectively in both informal and formal transaction.
3. To make learner able to read with comprehension and enjoy reading various kinds of interactional materials, and

4 To make learner able to write neatly, grammatically in logical sequence and be creative.

In order to achieve these objectives the emphasis in teaching is focussed on four language skills, namely, 1. Listening, 2. Speaking, 3 Reading, and 4 Writing. Since language is basically a skill subject it is proper that the scheme should be initiated through the development of competencies of various language skills. The minimum levels of learning have been stated in terms of skills and its competencies have been listed year-wise. It is expected that every child should be able to develop these competencies within the year for a particular class Details of competencies required to be developed in each class are given in the "Statement of MLLs in Language" at Annexure I Thus, the class-wise breakup of competencies pertaining to the four language skills is as follows.

TABLE 1
Total Number of Competencies for Each Class

Class	*I*	*II*	*III*	*IV*	*V*
Skills					
Listening	5	5	5	5	5
Speaking	5	5	5	5	5
Reading	4	4	6	6	6
Writing	4	4	4	4	4
Total	18	18	20	20	20

It must be made clear that, whereas there are four basic skills of a Language traditionally accepted, the number of competencies can be manipulated into many so as to simplify graded development of a skill of the learner. This would give scope to the teacher to plan his/her lesson with comfortable ease because textual material based on specific competencies/skills is not made available as yet and, therefore, the teacher has to develop his/her own instructional material to transact a particular language skill through the competency thought best by the teacher and most suitable to the classroom situation. Thus, as shown in the table a teacher has to take into account a total of 18, 18, 20, 20, 20 competencies pertaining to four language skills for classes I to V respectively on which his/her instructional activities are to be based in classroom situation.

INSTRUCTIONAL STRATEGIES ADOPTED

Although the competencies of language skills are listed separately for specifications of levels, the competencies are basically interlinked. The teacher has to take into consideration this interlinkage of competencies while attempting interaction with learners, the approach being from easy to difficult or from simple to complex. This was the first year of the implementation of the scheme so the entire coverage of competencies was divided into six units, one unit consisting of atleast one competency from each of the four language skills. Care was taken to see that the competencies listed under each skill are carried forward in a progressively graded manner through units I to VI in each class As this was a new experiment it took some time for teachers to become fully conversant with the strategy of its implementation The faculty of RIE, Ajmer maintained constant interaction with the teachers implementing this scheme in DMS, and provided academic assistance wherever need was felt Thus, with the completion of unit III the teachers became properly conversant with the scheme. The learners, as a first stage of instructional activity, were exposed to the identified competencies of the unit. Child-centred approach was the focal concern Competency-based teaching of Hindi with regard to a particular unit was done treating all learners as one group.

TEACHING-LEARNING ACTIVITIES

To make teaching-learning more interesting the teacher has to undertake variety of activities in the form of story telling, songs, poems, word-play, question-answer, riddles, etc The teacher proceeds with the notion that these activities would enable the learner to develop levels of comprehension of ideas in language through listening and reading, and be able to communicate through speaking and writing While attempting these activities the teacher is constantly conscious of the fact that just as "listening" and "speaking" are interlinked so are "reading" and "writing " However, emphasis is laid on the development of competency which forms the central teaching point on a given day in the classroom interaction It may be mentioned here that the teacher often feels difficulty for want of suitable instructional material specific to the particular competencies. More exhaustive training/orientation of teachers in this particular dimension may, perhaps, help them overcome this difficulty. The teachers on their part made all possible efforts to achieve the desired level in competencies.

EVIDENCE

Sample evidences of activity-based teaching of Hindi are as follows.

1. Class III Unit 5

The following competencies pertaining to the four language skills were taken up:

(1.3.5) – "After listening be able to answer questions of why."
(2.3.5) – "Take turns while speaking in group."
(3 3.5) – "Identify sequence of events and locate the main idea in a written text."
(4.3.3.) – "Write simple guided compositions."

The teacher would narrate a story with proper accent on words and would ask questions of "why." The learners would answer as and when their turn came. The teacher would ask further questions to raise the level of learners comprehension. Help of charts, pictures, objects would be taken to ask identical questions of comparable standard; through further probing questions, he/she would help learners to give the correct or near correct answers according to their turn in the group The teacher would then ask such split questions to students so that through answers they complete the story The learners would then be asked to read relevant split portions of the story from the given text. Finally the students would be asked to write answers so as to complete the story. Then the evaluation would follow

2. Class IV Unit 5

The given competencies are:

(1.4.5) – "After listening be able to answer questions using because and since."
(2.4.5) – "Learn about difference between formal and informal language."
(3.4.5) – "Recognise simple cause and effect relationship between ideas and events in a written text."
(4.4.3) – "Write guided compositions using paragraphs and punctuations."

The teacher would first read statements using words "because and since." The statements would be written on the blackboard and students be asked to read them. Similar statements/sentences would then be spoken by the teacher and learners be asked to write them. After this, learners are asked to read the sentences written by them. Similar activities are taken up by the teacher through the text of prose, poems, story, events and skill based exercises are carried with focus on the competencies identified above. After the teacher is satisfied that a good number of learners had achieved the required levels in the given competencies, evaluation would follow.

3. Class V Unit V

Following competencies are included in this unit

(1 5 5) – "After listening be able to answer questions using "if_______then" and "if not_______then"

(2 5.5) – "Use appropriate language in formal and informal situations"

(3.5 5) – "Make inferences from the information given in a written text."

(4 5 3) – "Write short free composition including simple informal letters and dialogues"

To interact on these competencies the teacher would write sentences on blackboard appropriate to the identified skill The learners would be asked to read them The learners were then asked such questions as would require answers relevant to the particular competency The teacher would then tell a story or narrate some event and learners would be asked to write independent paragraphs using words appropriate to the competency. Free passages would be given to the learners and they would be asked to write appropriate answers so as to indicate the inference Some event would be described by the teacher and learners would write it in their own language. Evaluation would take place after sufficient teaching is done

EVALUATION OF LEARNER'S ACHIEVEMENT

Evaluation of learner's achievement was done after completion of one unit Broadly, 3 weeks time was devoted to complete one unit. After each unit test those of the learners whose level of achievement ranked 80 per cent and above were identified as "masters" and the rest as "non-masters." The pattern of achievement indicated that upto 35 per cent of the learners do not achieve mastery level in the first attempt. So, remedial instructions were provided to the non-masters for about a week in respect of each unit The strategy for remedial teaching adopted was individual attention to the weakest learners among the non-masters The average and above average non-masters were assigned to the masters to help them learn the competencies under the guided supervision of the teacher After one week's remedial instructions non-masters were subjected to the second attempt evaluation. Improvement was noticeable throughout, but a few learners—about 10 per cent of the total—still could not attain mastery level and thus continued to remain non-masters. A major difficulty was faced by the teachers in this regard While proceeding to the next unit the non-masters of the earlier unit had also to be included. Thus in the second and subsequent units the non-masters of the earlier units did not achieve mastery level and thus continued to remain non-masters throughout A study of the evaluation indicated that a small number—about 10 per cent, remained common non-masters continuously. Another problem with evaluation was that there was very little scope for identifying individual difficulties of learners. So, there was practically very little that could be done by way of individual diagnosis of learners difficulties Wherever little efforts could be possible, the outcome was, however, not very encouraging. Socio-economic background and family environment of the learners could, perhaps, have been one of the reasons. This calls for a detailed and thorough investigation The following tables indicate size of masters and non-masters after I and II attempt. It is evident that remedial instructions help in reducing the number of non-masters, it is not completely eliminated, however For classes I and II mostly oral mode of evaluation was followed and for classes III to V it was through written and oral, both depending upon the need in respect of specific competencies.

The following tables give evidences about the achievements of learners in the acquisition of competencies. The first number in the numbering system of competencies used shows skills, i.e , 1 Listening, 2. Speaking, 3. Reading, 4. Writing; the middle number shows the class and the last number shows competency. "I Attempt," indicates evaluation level before remedial teaching, "II Attempt" shows evaluation level after remedial teaching.

TABLE 1
Class I

Competency No.	*I Attempt*		*II Attempt*	
	Masters	*Non-Masters*	*Masters*	*Non-Masters*
Unit IV				
1.1. 2	33	1	34	0
2.1.3	34	0	34	0
3.1.3	25	9	2	5
4 1 3	22	12	31	1
Unit V				
1.1.5	31	3	32	2
2 1 4	28	6	29	5
3.1 4	26	8	28	6
4 1 4	28	6	28	6

TABLE 2
Class II

Competency No.	*I Attempt*		*II Attempt*	
	Masters	*Non-Masters*	*Masters*	*Non-Masters*
Unit IV				
1 2.4	24	13	33	4
2 2 4	36	1	37	0
3 2.4	27	8	36	1
4.2 2	23	14	31	6
Unit V				
1 2 5	35	2	35	2
2 2 5	33	4	33	4
3.2.4	30	7	31	6
4 2 3	27	10	32	5

TABLE 3
Class III

Competency No	*I Attempt*		*II Attempt*	
	Masters	*Non-Masters*	*Masters*	*Non-Masters*
Unit IV				
1 3 4	29	10	35	4
2 3.4	30	9	35	4
3.3 4	27	12	29	10
4 3 2	24	15	30	9
Unit V				
1 3 5	25	14	31	8
2 3 5	29	10	30	9
3 3.5	26	13	29	10
4 3.3	30	9	30	9

TABLE 4
Class IV

Competency No	I Attempt		II Attempt	
	Masters	Non-Masters	Masters	Non-Masters
Unit IV				
1 4 4	35	11	41	5
2.4 4	38	8	41	5
3 4 4	30	16	42	4
4 4.1	35	11	45	1
Unit V				
1.4 5	34	12	42	4
2 4 5	37	9	42	4
3 4 5	35	11	42	4
4 4.3	36	10	43	3

TABLE 6
Class V

Competency No.	I Attempt		II Attempt	
	Masters	Non-Masters	Masters	Non-Masters
Unit IV				
1.5.4	34	13	42	5
2 5 4	33	14	43	4
3.5.4	36	11	43	4
4 5 1	41	6	47	6
Unit V				
1 5.5	34	13	44	3
2 5 5	39	8	44	3
3.5 5	34	13	44	3
4 5.3	40	7	46	1

These are the sample evidences in respect of competencies taught to the learners The details of all competencies taught in classes I to V during the year through six units are given in the Annexure I. Wherever felt necessary, some of the competencies were repeated in the subsequent units as well.

MAJOR CONCERNS AND ISSUES

Although it is the first year of the implementation of the scheme of competency-based teaching of Hindi and to point out issues and concerns conclusively may, probably, sound somewhat premature at this stage But, considering determined efforts made and keen interest shown by the teachers in its implementation there are valid reasons to highlight such major issues and concerns which are based on experience and are supported by the evidences obtained through instructional activities. They could be outlined as follows:

- The scheme of competency based-teaching was started in classes from I to V simultaneously. As the competencies are listed in class-wise progressively graded manner, the fact that teaching in preceding years for each class (except class I) respectively had not been done based on specific competencies, the missing links in instructional activities, at times, proved hampering the pace of achievements. The teachers, though, deserve appreciation for having accepted this challenging task and accomplished set targets.
- Lack of textual material suitable for competency-based teaching was a serious handicap with the teachers, as traditional form of textbook based teaching was to be avoided to the extent possible.
- Strong need for support material suitable to motivate learners to develop self learning skills was felt This restricted learners activities in functionality and creative use of language in day-to-day life situations.
- Remedial instructions did not appear very effective in arresting the size of non-masters. It is a serious concern and needs to be reflected upon for formulating alternative strategy.
- Problems got more compounded for non-masters as they had to be allowed to proceed to the next set of competency even while they had not mastered the preceding ones despite remedial teaching. Thus they did not progress satisfactorily.
- Size of class in terms of learners' number restricted teachers' efforts in making individual diagnosis of learners' difficulties.
- Competency-based approach in teaching of Hindi found favour with learners and their interest and involvement in instructional activities was always noticeable.
- The competencies pertaining to four Language skills need to be redrafted so as to become more realistic and functionality specific.

CONCLUSION

These concerns emerging from field data system seek immediate attention from policy perspective so as to strengthen competency-based learner centred teaching of Hindi at primary stage. Teachers need more exposure to activity-based instructional strategies. Additional resource support in the form of content oriented training appropriate to prescribed competencies is yet another need. Provision of suitable and relevant textual support material can also prove very helpful to teachers. Experience of implementing competency-based teaching has reinforced confidence in teachers and it can be said that given the active attention to the issues and concerns highlighted herein the scheme can certainly ensure learning of competencies upto mastery level by every child in a class. It would also ensure the acquisition of language skills to such a level where they become more sustainable. Recording of achievement level based on evaluation of competencies needs to be redesigned to spell out expected levels of standards.

Finally, the teachers deserve a word of appreciation for their whole hearted efforts in implementing the scheme of competency-based teaching of Hindi at Primary stage. It is a fond hope that their initiative would inspire all those who are sincerely committed to the cause of quality education.

ANNEXURE I

Statement of MLLs in mother tongue Hindi at Primary stage. The competencies listed below were taken up for classroom transactions under the scheme of competency-based teaching of Hindi which formed basis for this paper.

Class I

1.1.2 Understand conversation and dialogues in familiar situations
1.1.4 Recall simple information given in a short spoken text
1.1.5 After listening be able to answer questions of who, when and where
2.1.3 Answer simple questions requiring yes/no answers
2.1.4 Ask questions
3.1.3 Read aloud simple known words (of generally not more than three syllables)
3.1.4 Be able to acquire reading comprehension vocabulary of approximately 1500 words
4.1.3 Write simple familiar words and simple sentences.
4.1.4 Become aware of similarities between words on the basis of word ending

Class II

1.2.4 Recall sequences of events in a short spoken text
1.2.5 After listening be able to answer questions of what and how
2.2.4 Seek information about familiar things.
2.2.5 Speak politely and be attentive while listening
3.2.4 Be able to acquire reading comprehension vocabulary of approximately 2000 words.
4.2.2 Take simple dictation of conjunct letters and known words.

4 2 3 Write simple guided descriptive sentences
4 2 4 Become aware of similarities between words on the basis of word beginning, word ending and word roots (prefixes, suffixes and word stems)

Class III

1 3 4 Locate main ideas in a spoken text
1 3 5 After listening be able to answer questions of why
2 3 4 Take part in a dialogue.
2.3 5 Take turns while speaking in a group
3.3.4 Be able to acquire reading comprehension vocabulary of approximately 3000 words
3 3 5 Identify sequence of events and locate the main idea in a written text
3 3 6 After reading a simple text be able to answer questions of who, when, where and what.
4.3 2 Take dictation with unknown words.
4 3 3 Write simple guided composition
4 3 4 Become aware of meaningful relationship between words

Class IV

1 4 4 Recognise simple cause and effect relationship between ideas and events in a spoken text
1 4.5 After listening be able to answer questions using "because" and "since"
2 4 4 Take part in simple classroom discussion
2 4.5 Learn about difference between formal and informal language.
3 4 4 Be able to acquire reading comprehension vocabulary of approximately 4000 words
3 4 5 Recognise simple cause and effect relationship between ideas and events in a written text.
3.4.6 After reading a text be able to answer questions of how and why.
4.4.1 Write neatly and legibly.
4 4 3 Write guided composition using paragraphs and punctuations
4.4.4 Understand simple functional rules of sentence construction

Class V

1 5 4 Make inferences from the information given in a spoken text.
1 5 5 After listening be able to answer questions using "if then," and "if not . ... then"
2.5.4 Take part in plays, debates and make formal announcements
2 5.5 Use appropriate language in formal and informal situations.
3 5.4 Be able to acquire reading comprehension vocabulary of approximately 5000 words.
3 5 5 Make inferences from the information given in a written text.
3.5 6 After reading a text be able to answer questions using because, since, if. .. , then and if not then
4.5 1 Write with correct format, spacing, etc
4.5 3 Write short free composition including simple informal letters and dialogues
4 5 4 Understand simple functional rules of parts of speech.

Interesting Method of Teaching Hindi

(a. Studying Hindi as First Language, b. Non-Hindi Speaking Children)

Rohini Krishnanand

INTRODUCTION

Academic facilities were extensively made available to all children for the universalisation of primary education after our country's Independence. Though many more facilities are available today to improve the standard of primary education, these facilities show a widespread difference when we take into view the following·

(a) Institutional structure
(b) Teaching-learning strategies
(c) Abilities of children passing-out of school
(d) Quality.

The minimum levels of learning (MLL) have thus been introduced to remove this anomaly connected with quality in the education The main aim of MLL's lies in the fact that all the children irrespective of caste, creed, sex and religion receive the same level of education everywhere This gives a new direction to the methods of teaching. The teacher's aim lies in nurturing all the inherent competencies present in a child rather than completing the textbook. Teaching strategies assume an important role here. The subject matter assumes the role of a medium which is selected based on the minimum levels of learning whereas the teacher's role assumes importance when we consider the above facts

HARD SPOTS

There are quite a few hard spots in contents/competencies which create a stumbling block in the way of realising the objectives of teaching-learning Here the teacher has made an attempt to highlight a few hard spots in the areas of teaching Hindi as first language for those children whose mother tongue is not Hindi

DIAGNOSTIC TEST AT THE ENTRY LEVEL OF THE CHILDREN

When a child enters the school he/she faces a little difficulty in learning his/her mother tongue as the first language But when a child with no knowledge of Hindi comes to a language class to learn Hindi as a first language he/she teels insecure as he/she is not familiar with the pronunciation and sounds of words used in Hindi language.

When the teacher tries to measure the entry level knowledge of the class by entering into a dialogue with children, she asks the following questions·

(Few are mentioned here.)

1. What is your name?
2. What is your father's name?
3 Where does your father work?
4. Which animal guards your house?
5 Which colour does the parrot belong to?

The teacher asks many more similar questions She finds that children are unfamiliar with Hindi language. The competency level before instruction is shown below

TABLE 1

Class	*No of students*	*Masters of competency*	*Non-masters of competency*	*Competency*	*Teaching strategies*
I	5	0	0	Listening Speaking Understanding	Dialogue showing pictures Group Activity

All languages are learnt as the four fundamental skills of listening, speaking, reading and writing The teacher thought of laying stress on the competencies of listening and speaking. These two skills are interdependent and hence should be developed simultaneously

TEACHING-LEARNING STRATEGIES

To develop the above competencies the teacher adopted the following teaching learning strategies

1. Dialogue
2. Trips
3. Showing pictures
4. Games or play-way method
5. Singing (reciting poem with tune)

The teacher thought that these teaching-learning strategies are most suitable because the children will be attracted to them naturally. The teacher initiated the lesson with the help of dialogue, in the beginning During these dialogues the teacher asked various questions which the children answered either in their mother tongue or in English. After some days, the teacher found that the children showed some improvement in the understanding of Hindi which is tabulated below

TABLE 2

Class	*No of students*	*Masters of competency*	*Non-masters of competency*	*Competency*	*Teaching strategies*
I	5	1	4	Listening Speaking Understanding	Dialogue

The teacher thought that along with dialogue if the children were taken out of class on trips, the children would enjoy learning and would also be familiar with many new words used by the teacher during the trip. Dialogue and trips continued for some days in that order. The teacher showed pictures and asked various questions. The teacher examined the knowledge gained by the children and asked some difficult questions and asked the meanings of certain new words like.

Tell the meaning of the following words:
bird, tree, sun

Tell the colour of the following:
cloud, sky, crow, leaf.

The teacher found marked improvement in the usage of Hindi language which is tabulated below

TABLE 3

*Class**	*No of students*	*Masters of competency*	*Non-masters of competency*	*Competency*	*Teaching strategies*
I	5	2	3	Listening Speaking Understanding	Dialogue and Trips

Among different methods used, the teacher found that the playway method was more suitable because the children are fond of playing.

The teacher chose the following poem:
The poem on "Train" in Hindi

The above poem was selected considering the facts given below.

1 This poem invoves play acting

2. The teaching of the words were made explicit taking into account the sounds like Bhug-Bhug—relates to Engine, Chug-Chug—relates to the compartment

3 The children were also familiar with certain situations like buying and selling tickets and that the train can be used for reaching any place faster.

The teacher wrote only six lines on the first day. Children were walking behind each other like a train holding each others frock and shirt. Teacher recited the poem with actions which the children repeated. After several repetitions, the teacher found that though the children did not know the Hindi language, they were able to repeat all the lines mentioned above. The teacher explained the meaning of the unacquainted words by the help of actions, showing pictures of different games and with the help of a whistle The teacher took care to see that while acquainting the children with new words the joy of learning the poem was sustained

The next day after the teacher continued the next six lines of the poem repeating the previous six lines For this, the tables, stools and chairs were kept in different places in the class to denote Delhi, Calcutta and the names of different places. This train of children was made to go here and there in the class with a loud noise but stopped near the table marked Delhi. The children were reciting the line meaning "people going to Delhi, please come." Next time the train stopped in front of the table marked Calcutta. This time the children were reciting the line meaning "people going to Calcutta, please come soon." This way the train stopped at a chair (which denoted the booking office for tickets) for a minute and started immediately. The child issuing tickets sat on a chair but the other children who formed the train, refused to purchase the ticket and went ahead. At this time the children were repeating the line of the poem meaning "There is no use of buying ticket, the ticket has no value "

On the third day the teacher taught the entire poem and found that the children were excited and although they were not familiar with the Hindi language, they were able to understand the meaning of the words which were used in this game.

This way the children learnt the whole poem with the meaning within three days. The teacher found that this play way method was very useful in language teaching.

While experimenting with new teaching methods, the teacher faces many difficulties. It is his duty to resolve all minor problems. It is known as a problem diagnosis.

DIAGNOSTIC TEST

Through this test the teachr wanted to find out why certain children could not learn though they tried hard. The children were told a story about "The Tailor and Elephant" which was much easier and was related to familiar things around them. The children simultaneously dramatised the story when it was being told so that they could master more and more of what was being told. Slowly the children were able to understand the meaning of the whole story. Then the teacher asked many questions related to the story like:

1. Why did the elephant go for its bath everyday?
2. Why did the elephant befriend the tailor?
3. What did the tailor give the elephant?
4. What did the tailor's son give?
5. What did the elephant do when it got angry?

Other than this the teacher talked about people who help us in our daily lives like·

	Teacher	Student
1	The person brings milk to your house is.	Milkman
2.	The person who drives the bus is	Driver
3.	The person who plants seedlings and plant is	Gardner
4	The person who helps to catch thieves is:	Police
5.	The person who teaches in the class is.	Teacher

After this test, the teacher found that the main reason for not learning was the child's non-acquaintance with Hindi language Then the teacher experimented with some remedial measures. These methods are given below

REMEDIAL MEASURES

The competencies of listening and speaking are very important As the child's mother tongue is not Hindi, while experimenting the teaching methods, at every step, it is common, that the teacher comes across certain difficulties for which the teacher adopted the following remedial measures.

1. The teacher drew pictures relating to new words on the board and made their meanings explicit.
2. While questioning and talking the teacher used words and sentences in English and their mother tongue.
3. Using charts picturising stories giving them a chance to develop the competencies of listening and speaking
4. Using flash cards to increase their vocabulary and using these words in their dialogue.
5. Other than this the teacher asked the Hindi students of other classes to speak to the I standard Hindi students in Hindi so that the children got a chance to listen and speak Hindi other than the class hours

After experimenting with these methods the teacher found that the children had gained knowledge and the said competencies were achieved which are summarised below.

TABLE 4

Class	*No of students*	*No of students who achieved the competency (Masters)*	*Non-masters*	*Competency*	*Teaching Methods*
1	5	5	0	Listening Speaking Understanding	Dialogue Games, Trips Reciting poem with tune

This way children were successful in attaining the competencies of listening and speaking.

CONCLUSION

Other than these methods, the hidden qualities in children like humour, artistic quality, dramatisation and singing etc., can also be used as a method in teaching language. With this, on one hand the children understand the subject with ease and on the other hand they are able to adopt without any fear. During these activities the qualities of comraderie and cooperation are developed. These are necessary for the all round development of a child. It is the duty of every teacher to concentrate on the all round development of a child rather than its academic development to make the lesson more interesting. This will not only make children happy but also impart full satisfaction to the teacher

A Study of the Application of Minimum Levels of Learning in the Teaching of English as Second Language in Demonstration School, Mysore

M. Sharada

OVERVIEW

In the context of the Current National Priority on Universalisation of Elementary Education, classroom processes to motivate children to learn and for better achievement has become the major concern. The National Policy on Education 1986 (NPE 1986) has highlighted the need for qualitative improvement in elementary education. One of the attempts to improve the quality of learning is the trying out of Minimum Levels of Learning based (MLL-based), learner-centred approach which has been strongly advocated. It aims at lessening the burden on the teachers, especially in large classrooms by systematising instruction, specifying the terminal behaviour of the learner at the end of each stage of learning, using appropriate tools, and techniques for making learning an enjoyable experience and to orient teaching to attain the competencies mentioned. The MLL also provide the teacher and the learner a set of well defined competencies to be attained at the mastery levels by the learner.

The MLL formulated at various levels of language learning takes into consideration, the prerequisite (existing) competencies and needs of teaching first language to a group of learners. However, in actuality most of the learners come to school with no proficiency, whatsoever in English which is taught as the second language in Demonstration Schools. One also needs to take into consideration the total situation where in all the content subjects, namely, mathematics and environmental studies are also taught through English A gap exists between the competencies required of the learner and the competencies which they actually possess. The greatest need of the hour, therefore is to formulate MLL in second language so that it also covers the needs of the contest areas of other subjects since the medium of instruction, where the investigator studied this new approach in English. In the earlier years, by observation it was found that non-mastery in English language, through which the teacher teaches led to non-mastery in other subjects. So the need felt by the teacher to develop in children the four fundamental skills of language learning—listening, speaking, reading and writing in English at School itself, since the child cannot develop this language at his/her social circles, where the people speak the local language. Each student, in the present context occupies a significant place and therefore teachers will have to design and use proper strategies to develop in child, language skills at mastery level to use the language for effective interaction and hence to use the language for effective interaction and hence to promote his/her academic achievement. So an experimental study was undertaken by the investigator from July 1995 to April 1996 with class I students of Demonstration School, Mysore.

SPECIFIC OBJECTIVES

- (i) To study the effectiveness of child-centred strategies in improving the speed and accuracy of word recognition.
- (ii) To analyse effect of MLL-approach in language learning.
- (iii) To assess the level of reading comprehension of class I children.
- (iv) To find out whether the child acquired a reading comprehension of at least 500 words in English in place of 1500 words in mother tongue as suggested in the MLL document.

COMMUNICATIVE TECHNIQUES AND STRATEGIES IN SECOND LANGUAGE TEACHING

Competency-based teaching is entirely different from textbook teaching. For example, in the language classes, reading a lesson from the textbook and making the children write the answers to the questions given at the end of the lesson was the strategy followed so far. It was totally guided learning/teacher centred approach. But in MLL-approach, it is child centred. Most of the learning should take place through self learning—learning through materials and inter learning—learning through peer group interactions The teacher can proceed further only after testing them through various evaluation techniques for their attainment of competencies at the mastery level.

The National Documents states "It was decided that the committee will draw Minimum Levels of Learning only in respect of three subjects namely, Language (mother tongue) .. ." And again in talking about the achievability of MLLs, it is stated that " each region, preferably district, will examine the MLLs in relation to its own situation, and set immediate targets which would permit, within a reasonable expectation of improvement in school conditions and a specified time frame, mastery level attainment by almost all children in their schools The National Document, in effect recognises the need to adopt the MLLs depending upon the need and achievability in the various areas of learning This was what led to the revision of the existing MLLs to suit the teaching of English as second langugage in D M. School

Keeping in mind the actuality of the situation and the realistics needs of the learners, the teachers meeting I standard for the teaching of English felt the need to recast the language learning competencies listed for class I Given in Table below, are the language compentencies listed in the National Document and those arrived at by the teachers after a careful revision of the same

Competencies listed in the Document MLL at Primary Stage	*Revised Competencies—(Second Lanugage English*
1. Listening	
1 1 1 Listen with understanding the simple, familiar and popular rhyrmes, poems and tales	1 1 1 Listen with interest to simple rhymes/sentences/ stories by the teacher with appropriate actions and questures
1 1 2 Understand conversation and dialogues in familiar situations	1 1 2. Understand oral requests and simple instructions and commands in familiar situations.
1 1 3 Understand oral requests and simple instructions in familiar situations	1 1 3 Understand conversation and dialogues in familar situations
2. Speaking	
2.1.1 Repeat simple sentences correctly	2 1 1 Recite simple Rhymes and poems singing in groups with appropriate questures and actions
2 1.2 Recite simple Rhymes, poems and songs in a group with gestures and actions.	2 1 2 Imitate teachers' speech with correct intonation/pronunciation
2 1 3 Answer simple questions requiring Yes/No answers	2 1.3. Speak words/simple sentences with correct pronunciation.
2.1.4. Ask simple questions.	2 1 4. Answer simple questions requiring Yes/No answers.
	2.1 5 Ask simple questions ("What" questions)
3 *Reading*	
3 1 1 Recognise common letters of alphabet in combination and singly	3 1 1 Recognise letters of alphabet both capital and small.

3.1.2. Read large print and hand writing on black board, flash cards etc	3.1.2 Read printed/handwritten letters signly and in combination
3.1.3 Read aloud simple known words (of generally not more than three syllables)	3.1.3 Read out simple words (not more than three syllables)
4. Writing	
4.1.1 Copy consonants, vowels, *matras* and conjunct letters	4.1.1. Copy correctly the letters of alphabet both capital and small (Shape, stroke spacing/sequenced)
4.1.2. Write (from dictation) consonants, vowels, *matras* and conjunct letters.	4.1.2 Write from dictation letters of alphabet both capital and small
4.1.3 Write simple familiar words and simple sentences.	4.1.3 Write familiar words not more than 3 syllables with correct spelling
5 Comprehension of Ideas (Through Listening and Reading)	
5.1.1 Recall simple information given in a short spoken text	5.1.1 Recall simple information given in a short spoken text
5.1.2. After listening be able to answer question "Who" "When" and "Where."	5.1.2 After listening be able to answer questions of "What," "Where," and "Whose " (Wh-) questions.
6 Functional Grammar	
6.1.1. Become aware of situations between words on the basis of word ending.	6.1.1 Become aware of similarities between words on the basis of last phoneme
7. Self Learning	
7.1.1 Be able to use simple picture glossary where available.	7.1.1 Be able to use simple picture glossary where available.
8. Language Use	
8.1.1 Understand and use simple polite formulas.	8.1.1 Understand and use simple polite formulas
9. Vocabulary Development	
9.1.1. Be able to acquire reading comprehension of vocabulary of approximately, 1500 words.	9.1.1 Be able to acquire reading comprehension vocabulary of at least 500 words.

Here even though the competencies are stated under 9 major skills, it was felt that the skills 5, 6, 7, 8, and 9 can be incorporated along with four major skills in language—listening, speaking, reading, writing (LSRW) to avoid confusion.

Competency 5.1.1 can be incorporated as a part of 1.1.3. competency. 5.1.2. can be done along with 3.1.4. The structures introduced to learners as under 3.1.4 can be so compiled as to prepare them for "Wh"- questions. Since 6.1.1 in an important strategy practised at the pre-reading level, it need not be introduced as a separate competency 7 1 per cent is a study skill which is introduced simultaneously with the teaching of reading for comprehensions 8 1 1 is to be taught in a situtational context and is required at every stage of language learning In competency 9 1 1 the target of acquiring reading comprehension of 1500 words in English may be too ambitious since it is not the child's mother tongue Therefore, it has been reduced to 500 words. However, in the light of the post-tests which will be given to the children at various points of time a more accurate picture is likely to emerge because vocabulary acquisition is also spontaneous and words other than those in the class may be acquired by the learner.

FORMATION OF TEACHING-LEARNING STRATEGIES

Education in the past was limited to only a "select few" but now it is universal A very crucial and established factor influencing any learning is the maturational and experiential readings of the child So learning should be logically preceded by mastery of certain prerequisite concepts, skills and vocabulary Today, children enter class I at the age of 5 years Since the children of class I at the Demonstration School, RIE, Mysore are selected at reandon by computer, it is quite natural to have a group, both from the point of view of their schooling experiences and socio-economic background The class had children with one year and two years pre-school experiences in English/Kannada medium nursery schools. They are from different socio-economic and language background. These are the major factors which affect the child's perception of different learning experiences Keeping the above factors in view, a readiness test was conducted. This included a battery of oral tests with suitable pictures, action pictures, identifying community helpers, visual discrimination, sound discrimination, etc Then the data was analysed These activities with the children helped the investigator to know the details of the children and know exactly where the child stands This in turn helped sboth students and teacher to interact better. This also motivated children to attend school happily.

After ensuring the learner's readiness to learn, competency-based teaching-learning strategies were followed. The sequence of activities followed in this approach was as shown in the following flow chart.

Formulated "MLLs" Second language—English, with suitable modifications in the "MLLs" stated in the document for first language—mother tongue after a thorough revision of the same.

↓

Ensured School Readiness in class I children.

↓

Organised competency-based, learner-centred activities through self-learning, peer learning, guided learning and re-learning techniques for joyful learning by the pupils.

↓

Administered first shot competency-based test.

↓

Classified learners into masters and non-masters

↓

Conducted remedial instruction for non-masters through teacher-guided and self-learning techniques.

↓

Administered second shot competency-based test.

↓

Analysed reasons for learning difficulties among non-masters.

↓

Ensured achievement of mastery by more than 80 per cent of the learners after administering III shot test.

↓

Proceeded to the next competency.

Listening Skills

Develop the competency 1.1 1 and 2 1 1 at the mstery level, the teacher selected nursery rhymes which can be accompanied by gestures and actions with regular beat/rhythm. The idea was to involve them through the use of actions and the enjoyment of the acutal sound of the poem when recited aloud. Colourful pictures were made use of in making them aware of the meaning of key words and phrases in the rhymes

For competency 1.1.2 the teacher also took care to include in her speech, norms which are associated with the polite use of language as in making a request or declining it The classroom situation and the environment of the classroom were used in order to use the language contextually. It was noticed that with the repeated use of specific language, (language used for performing specific functions, like commands/requests in familar situations) the students responded by carrying out the instructions given This shows that unconsciously certain language structures were already being formed in their minds.

For developing competency 1.1.3 and 5.1.1 in children, many dialogues and stories in familiar situations were used. Many situations provided in the textbook were also used to develop and assess the pupils, conversation skills.

Speaking Skills

Competency 2.1.1 children recalled and recited together and singly the rhymes with which they were familiar with repeated drill. The rhymes were recited by the children with appropriate actions and gestures rhythmically

The competency 2 1.2 states that the learner imitates the teacher's speech and 2 1 3 states that the learner should speak words and sentences. To develop these competencies in children, they were asked to name the objects in the classroom, make requests for the objects (e.g , can you give me a pencil, please?), seek permission to leave/enter the class when the teacher was in the classroom, name objects and describe actions shown in flash cards/pictures. They were encouraged and guided by the teacher to make simple sentences (e.g., This is a . . .) till every child could produce at least one sentence independently.

To make the children answer yes/no (competency 2.1 4) they were shown objects, pictures, etc , and questions were asked. e g., Is this a Pen? (Show a pen) Ans Yes. Is this a Car ? (Show picture of bus) Ans: No etc.

Competency 2 1 5 is vice-versa of 2.1 4, the children were encouraged to ask "What" questions to their friends

Reading Skill

Reading readiness has been defined as state of general maturity which allows a child to read without excess difficulty (Charris, How to Increase Reading Ability). The learner picked up new words while listening to others or by reading.

Reading is for understanding, to acquire more vocabulary and to make use of them for effective interaction. But to begin with, the child has to recognise and read the letters of English alphabet (3.1.1 and 3.1.2) To develop these competencies in learner, letter cards and picture cards were used.

(i) to teach the recognition of alphabet.
(ii) to distinguish a small letter from a capital letter.

The sounds of the letter of alphabet with which the students were already familiar with were synchronised with the presentation of the symbol (letter) which represented them. At a later stage children were able to recognise the letters in a word.

The flash cards representing both capital and small letters were prepared by the children. They also coloured the letters prepared on the flash cards. From guided learning, the learners then progressed to inter-learning when they set in groups, helping each other to draw the required letter on cards. The teacher then tested for individual attainment when each child was asked to come forward and pick from a pile of letters the required letter, and show to his/her peer group. The children were also asked to assemble the letters in alphabetical order. They were also asked to identify the missing letters in a series

To develop the competency 3 1.3 in learners, children in groups of 3 were asked to make words by putting together the jumbled letters given to them. It was a reinforcing activity to identify the letters also They were instructed to make as many words as they could using the letters in 30 minutes The teacher carefully recorded the words formed by the children and wrote them on the blackboard. Even though some groups produced longer words like bicycle, Mysore, etc., the teacher chose only three or four lettered works This was then followed by the drilling of these words which consisted of the class reading the words aloud in chorus They were also instructed to read words from charts and textbooks Thus it served to reinforce the vocabulary of the learners To develop competencies 3 1.4 and 5 1 2 in learners, the structures given in the textbook and the similar ones formed by the teacher were used.

Writing Skills

At the class I level most of the learning should take place orally instead of making them sit at one place and ask them to write throughout the day. Writing for a longer period may result in fatigue and child may loose interest in the classroom activities. So in English language classes more importance was given to other skills—listening, speaking and reading—rather than writing. It is also important for the students to learn how to write correctly with proper stroke and spacing so that their writing skill should also be developed.

To master competencies 4.1.1 and 4.1.2 the learners copy down the alphabet which they could recognise and read from the blackboard. For those who found it difficult, the teacher wrote the alphabet in the individual copies. This was repeated a number of times with particular focus on those letters which the children found difficult to write or were confused about (For instance, (b, d), (e, c); (j, i), (G, g), (K, k); etc.,) After giving them sufficient amount of practice the teacher asked the children to reproduce in writing the letter that she had spoken alound. This dictation enabled the teacher to decide whether to take the children to the next stage, namely, the writing of words.

To develop competency 4.1.3, in learners words on the basis of last phonetic and familiar words with not more than three syllables were written on the blackboard. After conducting reading through chorus, the students were asked to copy them in their notebooks. Since they were already familiar with the letters of these words, they could write these words in their copies without much difficulty.

To make the children attain mastery in the competency 4.1.4 they were asked to copy simple sentences written on the blackboard. The words and sentences were selected in such a manner so as to meet the needs of the other content areas (mathematics and environmental studies) which helped them to understand and use these sentences wherever necessary.

The competencies 6.1.1, 7.1.1, 8.1.1, 9.1.1 were incorporated along with the previous competencies and tested on a continuous basis. During the competency-based, child-centred teaching-learning approach, the children were not burdened with any homework. All assignments, related tasks were done in the class only, hence maximising the schools' effort in learning.

EVALUATION TECHNIQUE USED

Language learning is a continuous process and so should be its evaluation. Language learning is also a comprehensive process as it involves development of skills—Listening, Speaking, Reading and Writing. Hence the evaluation should be comprehensive. The purpose of evaluation in language should not be limited to the learners attainment of various competencies at the mastery level.

It should be continuously checked whether the learner has attained the expected level in all the skills of language learning and whether he/she is using it effectively. The evaluation process should help the teacher to take decision regarding the progress of the child. Hence continuous comprehensive evaluation techniques were used to evaluate child's progress in attainment of language skills. They were tested both in formal and informal situations To test the LSRW-skills various language materials other than textual materials were selected and used. The innovative techniques used by the teacher to evaluate the attainment of skills in language are listed below.

Competency number	*Evaluation Tools and Techniques*
1.1.1	– children were asked to listen to the teacher and sing nursery rhymes.
	– recite the rhymes singly/in groups with appropriate systems and actions.
1.1.2	– to act according to the oral requests.
1.1.3	– follow and carry out simple instructions given.
5.1.1	– answer simple questions asked after a conversation/dialogue.
5.1.2	– retell the story/narration.
	– tell a story of their own relation.
	– answer some factual questions on the story/narration.
2.1.2	– name the picture when it is shown.
	– participate in tagging game like, Rat-Tap-Pot-Tea-Apple-Egg, etc.,
	– Speak looking at the picture glossary.
2.1.3	– repeat after the teacher a complete sentence.
2.1.4	– ask "What-questions" to their peer-group e.g., What is your name? What is this? etc.
3.1.1	– take out the spoken letter from the letter cards in a box.
	– arrange letters of alphabet in order (A to Z & a to z).
	– identify the missing letter/letters in the given series.
3.1.2	– read from the blackboard
3.1.3	– read from their notebook
3.1.4	– read from the flash cards
	– associate word with action
	– read from the textbook.

4 1 1 – copy the capital and small letters of alphabet from the blackboard—shape, stroke, spacing and sequence to be checked.

4 1 2 – Write the letter spoken by the teacher. (Dictation—capital and small letters)

4 1.3 – Copy the words given—tested for correct spelling and
6 1 1 accuracy.

– Write a rhyming word to the given word e g , Man-Van, Hen-Pen, Rat-Bat, etc

– Write as many words as possible in 15 minutes

4.1.4 – Fill in the blanks with suitable letter/word

– answer yes, it is/no, it isn't

– answer simple Wh-questions (questions begin with what, where and whose)

8.1 1 – Tested through observation, whether they use polite formulae with their teacher/friends etc.

9 1 1 – read words from the vocabulary list.

– read simple sentences

– read simple dialogue/narration/story.

The Challenging Situation That I resolved

It happened in one of my English periods during the second week of September 1995. I was teaching English to the children of Ist Standard 'B' Section I asked the children to name the different objects which were familiar to them. I showed them pictures of some locally available fruits and asked them to recognise and name them in English, for example, a picture of a banana and said "banana" so that they could repeat after me when I showed picture of a mango and asked them to say aloud "mango" one child said, "No miss, that is *mavina hannu*." (Mango is called as *mavina hannu* in Kannada.) He was confused why I was calling the same thing with another name. For a while, I was preplexed, since the child was perfectly right. I had to convince the child that it is called "mango" in English. And everybody knows how difficult it is to convince a child. I just thought for a while From their personal records, I knew that there were students with multi-lingual background in the class. I picked some children, whose mother tongue was Hindi, Tamil, Telugu and Kannada and made them stand in front of the class I took a water bottle and showed water to them and asked them what they called it at their homes.

They said one by one *"pani"* (Hindi), *"panni"* (Tamil), *"nellu"* (Telugu) and *"neeru"* (Kannada). I said "It is water." Then I showed then a flower and similar activity took place. They said *"phool"* (Hindi), *"poovu"* (Tamil), *"poova"* (Telugu) and *"hoovu"* Kannada) I said "It is a flower." Then I

Data Regarding the Learners Achievement

Competency No.	*No. of children attained mastery at*			*No. of Masters (Out of 31)*	*No of Non-masters (out of 31)*
	I Shot	*II Shot*	*III Shot*		
Listening					
1 1 2	23	3	2	28	3
1.1 2	31	0	0	31	0
1 1.3	22	4	2	28	3
Speaking					
2 1.1	22	5	2	29	2
2 1.2	27	3	0	30	1
2 1 3	26	2	2	30	1
2 2.4	28	1	0	29	2
2.1 5	27	1	1	29	2
Reading					
3.1.1	28	1	0	29	2
3.1.2	28	3	0	31	0
3 1 3	22	5	2	29	2
3 1 4					
Writing					
4.1 1	23	4	3	30	1
4 1.2	18	7	3	28	3
4.1 3	15	6	5	26	5
4.1.4	14	8	4	26	5
5.1 1	20	5	2	27	4
5 1.2	20	4	3	27	4
6.1 1	21	5	2	28	3
7 1 1	23	2	3	28	3
8.1 1	26	3	2	31	0
9.1.1	21	2	3	26	5

explained that each one called the same thing with different names because they speak different languages at home where as we speak English in school, and English is also a language just like any other language they speak at home. The child who created the situation along with the other children got convinced and started accepting different names for the same object in different languages. I found that the children benefitted from this particular activity. They became curious to find out different names for the objects in the classroom in different languages and also in English. They were enthused to learn more. I too felt relieved and happy. I was also enthused to face such challenging situations which are expected in my future teaching-learning process.

Learning Difficulties

Learning difficulties in this class did not arise from the competencies because they were revised to meet the needs of the learner. However, at each state of learning, difficulties arose on account of the following reasons

- (i) Lack of exposure to the language and therefore inhibitions in learning the language.
- (ii) The mechanics of writing due to lack of muscular coordination.
- (iii) In the case of 2 or 3 non-masters in the section, learning difficulties need to be further diagnosed by specialists because it may not be possible to remedy them by common classroom practices.

REMEDIAL MEASURES

Most of the non-masters were partial achievers. They needed more exposure and drill to recognise, read and use the skills for interacting with their peer group and the teacher. So, most of the remedial activities incorporated guided learning and self-learning techniques. The masters were engaged with some reinforcing activities/asked to help the teacher to conduct remedial activities. The activities carried out consisted of group work, pair work and individual work, under the supervision of the teacher. The following activities led the children to attain mastery of the required competencies through re-learning

1. Singing number rhymes/nursery rhymes with rhythmic beats and appropriate actions by the masters followed by the non-masters.
2. Collecting pictures of animals, birds, fruits, vegetables and insects from old newspapers/magazines
3. Making colourful letter cards/flash cards
4. Making identity card of the child with name, class, section and school.
5. Arranging letters in the alphabetical order
6. Language games—tagging letter game, asking non-masters to close their eyes, keep their index finger on some picture on the chart and try to name them in English.
7. Framing words using letter cards.
8. Drill work to develop writing skill.
9. Framing sentences using the words given and writing them.

These activities helped the child to improve his/her vocabulary in English and use them successfully whenever necessary. It was found the learner got enthused and motivated to learn the language

MAJOR OUTCOMES

(i) Joyful learning was observed.
(ii) The pupils were found learning faster through activities with their peers.
(iii) There was a considerable improvement in the reading comprehension among class 1 children.
(iv) The vocabulary achievement test revealed, that the students of class 1 can recognise, read and comprehend only about 500 words in English instead of 1500 words (in first language) as stated in the MLL-document, so the competencies should be revised and new set of competencies should be formed for second language (English), since English is not the mother tongue of the learner.
(v) The MLL-approach was found effective in developing the four major skills of language in children and it is worth following since it generates quality learning.
(vi) It was found that the learners were using the acquired vocabulary for effective interaction.

IMPLICATIONS OF FINDINGS FOR UNIVERSALISING ELEMENTARY EDUCATION

English language learning takes the pivotal place in English medium schools. Since it is through this language that the child learns all the subjects in school The non-mastery in this language at the primary stage may lead to low achievement by the learner at upper primary and secondary classes which may lead to wastage. Drop outs also may occur. So to overcome all these problems proper development of four major skills in language—LSRW— at mastery level is required right from the grassroot level, i.e., primary level. This would facilitate the learner to learn better the other curricular areas. The innovation techniques used here would stimulate teachers to think and use available resources for conducting child-centred activities effectively It would help the teachers to integrate language with content areas and design teaching-learning strategies to make learning at school joyful.

CONCLUSION

The whole approach of Primary education is shifted from teaching to learning The MLL approach aims at the development of competencies but not at the coverage of content Proficiency in the use of language is an important criterion in judging the success of the learners and it is also the means of enabling them to imbibe the concepts inherent in the content areas that the pupil has to master. In fact the communicative approach to language learning, in recognising the above need, has made the learning of content areas the means to achieve language abilities Language in use, rather than the mere usage in language has been stressed by educationists in recent times In addition to the strategies being practised by language teachers for MLLs, it is necessary that their teaching should incorporate important vocabulary items and structure from content areas namely, mathematics and envionmental studies. In doing this we will be "putting the horse before the cart" rather than what is being currently done in many content classes where "the cart is placed before the horse."

Innovative Strategies to Accelerate the Learning Competencies in Reading Comprehension and Writing in English (Second Language) among Masters and Non-masters Simultaneously

N. Swarna Lekha

The students attain mastery level at different time points due to individual differences. Therefore the kinds of tasks provided should be creative and different so that high achievers do not suffer boredom or monotony during the remedial teaching undertaken for non-masters. In the present Action Research an attempt has been made to field test the new strategy to provide enrichment tasks for masters along with remedial teaching for non-masters.

INTRODUCTION

At the primary level language occupies an important place in the curriculum and mother tongue is mostly taught. However in India, English is taught as second language at the school level which poses some peculiar problems. The problem is multiplied where the medium of instruction is English and the children admitted are from different strata of the society.

Language learning skills in primary classes are those of listening, speaking, reading comprehension and writing. Once reading comprehension and writing skills have been developed, self-learning becomes possible. Vocabulary is also dependant on these basic skills

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The investigator is indebted to Prof. D.K Bhattacharjee, Principal, RIE, Bhubaneswar for his guidance

Activity-based teaching introduced by NCERT, should not remain restricted to achieve minimum levels of learning, it should simultaneously provide enrichment tasks and creative activities to high achievers who attain mastery level quickly An attempt has been made in this study to find out how it can be done, and with what results.

OBJECTIVES

The objectives of this study are·

1. To field test the strategies to accelerate the learning competencies in reading and writing in English among masters and non-masters simultaneously.
2. To provide enrichment tasks to masters through enjoyable and interesting activities.

METHODOLOGY

(a) Strategies

The strategies developed were field tested under the four major teaching-learning dimensions:

(i) Teacher guided learning
(ii) Child to child learning
(iii) Self learning
(iv) Drilling/Re-learning.

(b) Time Period

September 1995-February 1996.

(c) Sample

35 students of class I (of random selection), D.M. School, R I.E., Bhubaneswar

(d) Age group 5+

INSTRUMENTATION

(a) Teacher Guided Learning

Teacher guided learning was facilitated by preparing word cards with students' participation

1. Refill packs of Surf, Bournvita and Cartons of Toothpaste, Soap, etc., were cut into strips measuring 2/5 cm, with the help of students.

2 While learning of speaking and listening competencies were in progress, a list of words was prepared (about 500) with students' participation.

3 The words were then written on the cards by students and teacher.

4. The words were then separated as a 3 letter, 4 letter and 5 letter words.

5. Ten words of equal difficulty level were tied in a bundle with the help of rubber bands and put into cardboard boxes

6. Words which appear in mathematics and environmental studies were also written (add, subtract, large, small, face, nose, etc)

7. Each of 3 or 4 students were given one bundle. They were asked to read the words in turn after which the teacher wrote them on the blackboard. In this teacher guided approach reading was given priority in the beginning

8. Once the students had mastered all the 3 letter words, they continued the same procedure for 4 letter and 5 letter words. The high achievers (masters) named even 6 letter and 7 letter words which they learnt while listening Here the teacher observed the transfer of learning and encouraged them to prepare word cards for the new words In the meantime the non-masters were guided by the teacher to attain the minimum levels of learning with 3 and 4 letter words. As the masters were engaged in enrichment tasks, individual attention was paid to non-masters.

9. Once some reading competency was achieved the teacher proceeded with writing the words.

10 Each child picked up a bundle of words according to his/her potential and wrote them in their note books. Here the teacher made an observation that very young children (who are just 5+) are able to write better and faster by seeing the word cards placed close to them than by copying from the blackboard. They could even ask for clarification of their doubts by showing the cards. Further they continued to write the words enthusiastically thus showing greater motivation.

11. While the children were engaged in writing, the teacher guided them individually to spell, pronounce and read the words correctly.

12. Every day after their written work was over all the word cards were mixed up and distributed to the students. They would again read and identify the words as 3 letter, 4 letter and 5 letter words and make different combinations of 10 words in each bundle. This served as a mental exercise and preparation for the word game and cross word puzzle to be played later

(b) Child to Child Learning

1. After a week's practice of "teacher guided learning" the teacher could

silently observe the potential of each child and form mini groups by mixing masters with non-masters.

2 Before allowing the children to interact in groups, the teacher prepared the guidelines for students which is very important to maintain classroom discipline. The masters were asked to learn from partial masters and non-masters This was done to avoid any inferiority complex they would otherwise develop if the high achievers dominated over them

3. Each group was given a bundle. One person from the group reads the word This was followed by repetition by the peer group. Care was constantly taken to give leadership to non-masters and it was observed that the correction of mistakes made by the masters was taken in a healthy spirit by the non-masters

4. Each student of the group would then write the words in their note books. Once they completed one bundle, they would ask for the next bundle and the group competition of writing (as many words as possible) stimulated the student who would not get tired of writing till the teacher asked them to stop'

5. The students would then exchange the bundles, mix them, sort out and keep them in separate boxes.

6. While child to child learning was in progress, the teacher could devote all her time to low achievers and remedial teaching was done for them instantly The teacher could detect and correct the defective pattern of writing, wrong pronunciation, etc., without disturbing the high achievers who were busy writing more difficult and bigger words and drawing pictures for illustrations.

7. After the students finished writing about 20 words, a sheet of paper was given to the group of non-masters in which about 40 words were written at random. They would read aloud each word and spell it with the guidance of the peer group. The others would look for that particular word in their note books and if they found it they would encircle it, e.g., (Head) The student who gets maximum number of encircled words is declared as the "Lucky Winner" This method proved to be very successful for re-learning later, as the students had to go through all the 20 words to find that particular word

8 Group competition was also organised among the peer group by naming the word on seeing a picture

9. The teacher observed that very slow learners formed a better learning group when mixed with partial masters

SELF-LEARNING

In three to four weeks time the high achievers had developed mastery over minimum levels of learning competency and there was a great need to engage them in enrichment tasks while the other 20 per cent of the class were engaged in learning practice. The enrichment tasks were assigned to the high achievers in the following ways

1. They were asked to draw the picture, colour them and name them by recalling the words.

2. They cut the pictures and pasted them on black glazed paper thus contributing to parts of a picture dictionary on the display board in the class.

3. The masters would recall all possible words from other subject areas Here the teacher could optimally utilise the potential of high achievers in linking the competency of other subjects by use of words like add, before, after, square, round, festival, pond, tree, etc. Some of them could construct meaningful sentences. This was also linked to the competency of teaching body parts, cleanliness, family, etc., of environmental studies. The slow learners contributed to colouring, cutting, pasting the pictures on the display sheet.

4 Students could think of words which do not appear in the textbook and wrote the spellings on their own

5. Once their vocabulary increased to a considerable level, they could identify the words ending with same letters call, tall, fall, book, look, etc. Here the teacher spread over the contents from simple to complex. Low achievers or slow learners would pick up word cards of 3 letter and 4 letter words which were easy and common:

Bat	Cat	Mat
Book	Cook	Look

While the high achievers could read more difficult spellings and more letters of the word.

Fish	Dish	Slow
Flow	Tall	Call

Slowly they could construct long meaningful sentences using "naming" and "doing" words (functional grammar)

- — Meera is writing
- — Sita is dancing with Geeta
- — Anil is playing in the garden
- — We see with our eyes.

They were also encouraged to prepare additional cards for words which they were able to read and comprehend by seeing T V, school notice board, newspaper, posters on the road, etc.

DRILLING

Drilling or re-learning was accelerated in a joyful manner by organising word games, cross word puzzle, a game of housic, word quiz, etc Drilling for non-masters was associated with enrichment tasks for masters.

Some language games played in the class were·

1. Housie-Housic

(i) 10 to 15 cards were made containing 10 different words.
(ii) Each group was given one card.
(iii) A big sheet of paper in which all the 50-60 words were written was given to the team leader, who spells the word and reads it loudly while all the groups listen carefully and strike off the word if it appears in their card. Since the words are mixed randomly no two teams would finish striking off all the words at the same time. The team which strikes all the 10 words first is declared the "Lucky Winner." This game was enjoyed by all as it involved no written work and re-learning was completely successful. Each time a word was spelt and read, I feel, it was recorded in all the 35 brains with full motivation and concentration.

The teacher planned a variety of word games keeping in mind the competencies of other subject area also.

Games were also organised to read and understand the instructions given in the question paper like Tick (✓), circle (O), Cross out (X), Underline (_____), etc. This enabled them to answer the test without any confusion.

An illustration of other word games played are given in Figure 1.

ANALYSIS AND DISCUSSION

This new strategy of introducing individual word cards was implemented after completion of 3 unit tests. When the 4th test was given it was observed that the number of masters increased in the first shot.

A glance at Table 1, 2 and 3 shows that out of 35 students masters ranged between 30-34 (86-97 per cent) in all the competencies and non-masters were 1-5 (3-14 per cent). It was interesting to note that when the

CROSS WORD PUZZLE

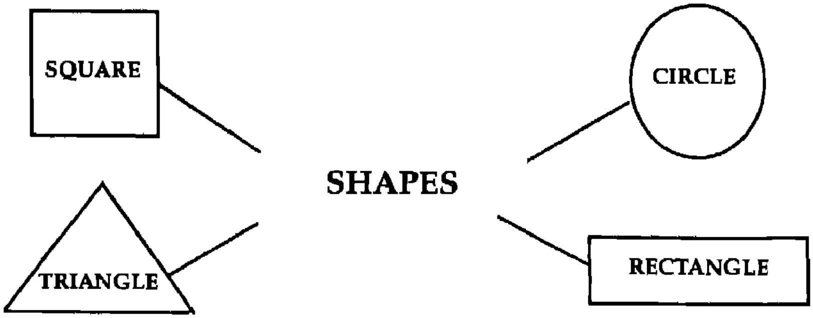
CLUE-COLOURS:

	B		Y					W
B	L	U	E					H
	A		L					I
	C		L					T
	K		O	R	A	N	G	E
			W				R	
							E	
							E	
			B	R	O	W	N	
				E				
				D				

ENCIRCLE THE MEANINGFUL WORDS:

M	H	F	B	A	G	J	F	H
A	N	F	I	F	E	Y	T	O
P	O	O	R	Z	N	F	F	R
Z	O	O	D	O	G	G	K	S
J	Q	X	Z	Y	O	I	S	E
K	G	Q	L	S	A	R	T	S
B	O	O	K	Y	T	A	P	Q
A	I	J	I	Z	Z	T	E	I
T	X	W	T	P	U	X	T	J
V	M	X	E	G	G	O	S	F
Z	V	Q	U	U	O	Q	W	Z

FILL IN THE BLANKS



FIND NAMES OF BODY PARTS

T	E	E	T	H	P	P	D	D
M	Y	Y	V	V	U	U	F	G
N	X	E	A	R	T	S	A	I
X	Z	R	Z	T	T	T	C	J
M	V	L	U	N	O	S	E	L
O	W	E	V	A	L	T	I	N
U	Y	G	W	I	F	O	K	P
T	Z	Y	Y	L	N	M	J	R
H	A	N	D	Z	H	A	I	R
Z	P	Z	T	D	A	C	Q	P
X	Y	Y	U	W	V	H	I	P

CLUES:

Ear	**Face**	**Teeth**
Eye	**Nose**	**Stomach**
Leg	**Hand**	**Mouth**
Hip	**Nail**	**Hair**

Figure 1

TABLE 1

Competency	Unit I		
	Master in		Non-master
	Ist shot	IInd shot	
Reading (identifying alphabets)	23	7	4
Writing alphabets capital	28	5	1
Writing alphabets small	26	7	1

TABLE 2

	Unit II		
Reading small words	26	5	3
Copying 3 letter words	25	8	1
Writing words starting with same letter bat, big	25	5	4

TABLE 3

	Unit III		
Reading words aloud (known and unknown)	17	13	5
Writing the words by seeing	25	6	4

TABLE 4

	Unit IV New Approach		
1 Ability to read 500 words	29	5	1
2 Ability to form words on the basis of word ending (bat, mat, cat)	33	1	1
3. Write words by listening (dictation)	30	4	1
4. Construct small sentences with guided words	28	6	1

teaching learning strategies were changed with individualised instruction the number of masters increased in the Ist shot (Table 4) In other words more students could master at 1st shot and the non-master's percentage diminished and was negligible.

Major Outcomes/Findings

The findings of the study are tabulated below:

1. More students could become masters at first attempt itself if this approach is followed.
2. Remedial teaching for non-masters was not monotonous and the masters were fruitfully and enthusiastically engaged in enrichment tasks.
3. Blackboard work was minimised and the teacher spent more time and attention on slow learners without distracting the high achievers.
4. Individualised instruction was practicable as each child could learn at his/her pace and potential.
5. Teaching aids could be prepared with students' participation and without much expense.
6. Reading and writing skills were both developed satisfactorily.
7. There was less indiscipline in the class as the children were busy with self-learning materials.
8. Reading from word cards increased the concentration of the students.
9. Peer tutoring was highly successful Pairing of low + average achievers proved to be more successful than low + high achievers The average achievers could communicate better with a non-master.
10. Teacher's work was lessened as he/she was only a facilitator.
11. Word games and puzzles contributed to re-learning and increased retention
12. Drawing and SUPW classes were fruitfully utilised to engage the masters in cutting, drawing, printing, preparing the teaching aid, word cards, picture dictionary, display for the board, etc.

Implication of Findings

1. This strategy can be adapted to teach any regional language in both rural and urban areas.
2. Supplying individual word cards with "no cost" teaching aids may help to sustain the motivation of students to attend school regularly.
3. This strategy can be successful even in schools which lack minimum facilities (like blackboard, furniture, etc.)
4. The teacher is only a facilitator. Therefore this strategy can be effective in a classroom of low teacher pupil ratio and also for multigrade teaching.

CONCLUSION

Child-centred learning based on activities (so that students acquire the desired competencies) is a successful method to enable the students to attain mastery level competency. If the teaching-learning strategies are modified from time to time involving creative and new activities, learning can become a joyful experience, both for the teacher and the student. Therefore, along with remedial teaching for non-masters, stimulating, enrichment tasks should be provided simultaneously for masters so that self-learning is encouraged.

Learning Strategies Adopted for the Achievement of Mastery in First Language (Kannada) For the Non-Masters of Classes I to IV Based on Minimum Levels of Learning

B.S. Subhadra

INTRODUCTION

In recent years there has been a change in the policy of education. Consequent upon the National Policy on Education 1986, there has been a thrust on the MLLs. For substantial improvement in the quality of primary educatoin, Minimum Levels of Learning has been initiated so as to enable all children to achieve essential levels of learning. In the Revised Policy Formulation and Programme of Action 1992 (POA 1992), the urgency for ensuring the minimum levels of all students has been again re-emphasised.

The Minimum Levels of Learning includes the desirable change in the learner's cognitive and psychomotor domains The learner should attain a set of competencies or levels in each curricular area. For each class a set of competencies are prescribed which ought to be acquired by every learner in a stipulated time-frame of learning MLL approach also includes mastery learning, continuous and comprehensive evaluation and competency-based teaching. A scheme of evaluation which helps the teacher to assess the students whether they have mastered or not the competencies in sequence, refers to the continuous and comprehensive evaluation Mastery-learning means that all the competencies or almost all the competencies are to be mastered by all the children or almost all the children In the day-to-day teaching-learning situation, it is the teacher's duty to ensure the achivement of the competencies designed for the particular class by all the students. For practical purposes, it is also agreed that atleast 80 per cent of the competencies are to be mastered by at least 80 per cent of the students

To achieve the mastery-level through continuous and comprehensive, approach the teacher should select such activities which are child-centred, activity-oriented and competency-based teaching. Each major competency may have several sub-competencies The teacher should develop such teaching-learning activities which are directed towards these competency-based strategies.

PROJECT ON MLL-BASED TEACHING IN D.M.S., MYSORE

During 1995-96, MLL approach was followed in the primary sections of D M S , Mysore, a laboratory school of the RIE, run by NCERT, the apex organisation at the national level for school education. All the four classes I to IV with two sections each followed the MLL approach enthusiastically. These classes have students admitted at class I stage through computerised random selection Thus, these sections have a heterogenous group of learners, who come from the cross-section of the society with varied abilities. The average strength of the students in each section is 35, which is an ideal class situation.

By December end, it was found that the MLL approach was found to be successful in all these classes with minor drawbacks. It was found that in first language, Kannada, there were a few students who were non-masters and they do not come under 80 per cent by 80 per cent. The class identified that 9 students of class I A and 7 students of I B (totally 16 students) were non-masters. In class II A there were 8 students and II B there were 5 students (totally 13 students) In III A there were 7 students and in III B there were 12 students (totally 19 students). In class IV A there were 6 students and in IV B 4 students were identified as non-masters (totally 10 students) (16 + 13 + 19 + 10 = 58 students)

My decision was to take up an action research in the writing skill of these 58 non-masters in their first language, Kannada. Language occupies an important place at the primary level. The importance of the language may be said in these words: "An arbitrary system of vocal symbols by means of which human beings as members of a social group and participants in culture interact and communicate."

OBJECTIVES OF LANGUAGE LEARNING

At the primary stage, the main objectives of language learning are:

(i) to be able to listen with understanding,

(ii) to be able to speak effectively in both informal and formal transactions,

(iii) to be able to read with comprehension and enjoy reading various kinds of instructional materials,
(iv) to be able to write neatly, with logical sequence and creativity,
(v) to be able to comprehend ideas through listening and reading,
(vi) to be able to use grammar functionally in various contexts.

KANNADA AS FIRST LANGUAGE

Kannada is one of the languages among the constitutionally approved 18 national languages in India. Kannada language belongs to the Dravidian group of languages, the other major Dravidian languages being Tamil, Telugu and Malayalam This Dravidian group is the second largest language group in India, the first one being the Indo-Aryan language group.

Kannada is the major language of Karnataka state. This language has 49 alphabets (*Varnas*) Among them 15 are vowels (*Swaras* ಅ to ಅಃ) and 34 consonants (*Vyanjanas* ಕ to ಳ) Apart from these basic 49 alphabets, the students in class I have to learn *matras* (*Kāgunithas*) also. *Matras* are the combination of vowels and consonants (34 × 15 = 510) Thus, the students who have to study Kannada as first language, have to learn the Kannada script which is characterised by perfect one-to-one grapheme-phoneme correspondence. The students have to learn other neccessary forms, word building, sentence formation, gender, tense and functional grammar.

The basic skills of learning a language are listening, speaking, reading, writing comprehension of ideas (through listening and reading), functional grammar, self-learning, language use and vocabulary. The language of a child develops gradually from one class to the next higher class with the acquisition of these language skills These skills are from simple to complex and inter-related. Listening is the first basic skill and writing is the important complex skill.

STATEMENT OF MLLs IN LANGUAGE (FOR WRITING COMPETENCY)

Class I:	4.1.1	Copy consonants, vowels, *matras* and conjunct letters.
	4.1.2	Write (from dictation) consonants, vowels, *matras* and conjunct letters.
	4 1.3	Write simple familiar words and simple sentences.
Class II.	4 2.1	Copy word and sentences.
	4 2.2	Take simple dictation of known words.
	4.2.3	Write simple guided descriptive sentences.
Class III·	4.3.1	Take distinctions of correct shape, sequence, spacing of letters and words
	4.3.2	Take dictation with unknown words
	4.3.3	Write simple guided composition.

Class IV· 4 4 1 Write neatly and legibly.
4 4.2 Take dictation with simple punctuation marks
4.4 3 Write guided composition using paragraphs and punctuations.

METHODOLOGY ADOPTED

Pre-test

The 59 non-masters from class I to IV were given a pre-test The test papers were prepared class-wise based on the competencies of the MLL of each class The test was administered separately for each class. No time limit was imposed for writing the test The test papers were question-cum-answer booklets. Test items were of both multiple choice and free response types. Examples were given at certain stages to follow Loud reading of these questions along with question numbers was done The number of total items were about 25 to 32 for each class

For class I, the test-papers for maximum 25 marks included as many as 32 items including identification of letters, *matras* and conjunct letters, copy-writing, vocabulary items, sight words, construction of own sentences, items of syntax, etc. The sub-competencies included 3 1.1, 4.1.1, 4.1 2, 4.1.3, 6.1.1, 7.1.1 and 9 1.1.

For class II, the test paper included as many as 25 items including identification of conjunct letters, formation or words from letters, jumbled words, copy-writing, word meaning, correct phonetic words, making own sentences from the given words, items of syntax, writing 3 sentences on a known subject, etc. The sub-competencies included 3.2.1, 4.2 3, 5.2 1, 6.2.1, 7.2.1 and 9.2 1.

For class III the test paper had 30 items including copy-writing of a small paragraph, writing answer after reading a portion of a poem, correcting the sentences, identifying the correct meanings for the words from the given set, writing synonyms, identifying the person with occupation, combining two words for functional use, combining two sentences, making own sentences from the given word, making a sequence of sentences from the given clue, arranging the jumbled sentences in the proper order, antonyms, etc. The sub-competencies inlcuded 4 3.1, 4.3 2, 4 3.3, 5.3 1, 6.3.1, 7.3.1 and 9.3.1.

For class IV the test-papers included as many as 30 items like copywriting of a paragraph with punctuation marks, writing answers from a given poem, combining 2 or 3 small sentences, combining words for functional use, matching antonyms, writing synonyms, paragraph writing simple questions, etc. The sub-competencies included 4.4.1, 5.4.1, 5 4 2, 6.4.1, 7.4.1 and 9.4.1.

The performance of these students were analysed carefully to identify the hard spots.

Writing skill requires a high degree of organisation in the development of ideas and information. It includes the use of complex grammatical devices for focus and emphasis. It needs a careful choice of vocabulary, grammatical patterns and sentence structure to create a suitable situation.

FINDINGS OF THE PRE-TEST

It was found from the pre-test that the performance of these non-masters were 35.12 per cent, 24.6 per cent, 26 per cent and 35 2 per cent respectively from class I to IV.

(i) It was observed that these non-masters tend to ignore the distinguishing features of the letters. This leads to confusion between letters of almost identical shape– ಅ–ಆ, ಉ–ಊ, ಎ–ಏ, ಒ–ಓ–ಔ, ಚ–ಛ, ಪ–ಫ, ಶ–ಷ.

(ii) The size, shape, slant, legibility of the writing aspect is not taken care of.

(iii) The non-masters have not mastered the strokes—horizontal/circles, semi-circles. They have not understood that the letter figures are the combinations of certain componets like strokes.

(iv) The students have not understood the formation of letters—where they begin, how they proceed and which strokes are used to make them.

(v) The non-masters do not write with correct punctuation marks.

(vi) The non-masters do not have the idea of logical sequence and creativity.

ALTERNATE TEACHING-LEARNING STRATEGIES

From January 1996 these non-masters were made to undergo a series of activities. They were taken out of their regular classes during these sessions, twice a week. These teaching-learning activities included model-writing, dictation, word-play, adding prefix and suffixes, antonyms and synonyms, model reading, story-telling, gender, singular-plural, picture-composition, conversation, riddles, group discussions, paragraph-writings, etc. Through group activities, self-learning skills and functions, use of language was developed. Use of flash cards with words or pictures enhanced their ability to construct the sentences.

SPECIFIC OBJECTIVES

The specific objectives of the teaching-learning strategies were to (a) provide opportunities to establish association between particular grapheme and phoneme, (b) give practice in the analysis and synthesis of particular words

The order of teaching grapheme did not follow the conventional sequence Teaching of letters followed symbol system representing consonant-plus-vowel combinations.

Each session (period of 40 minutes) included a number of words that could be coined out of the graphemes taught in that period and the previous periods. There was provision for cumulative learning and practice Thus the teaching-learning activities included diagnostic and prescriptive approach These periods provided a variety of situations to the students, active involvement of these non-masters in the teaching-learning process, developing and sustaining motivation and immediate feedback

COPYING

The skill of free copying had to be monitored with proper guidance—which part of the letter should be confined to the two lines, which should go beyond the upper line and lower line. Stress was laid on the vowel symbols, their difference and distinct position when they join the consonants The activities included from simple to complex, from letter to words and then to sentences and finally to group of sentences or paragraphs

Tamarind seeds, Nilgiri seeds which are locally available, coloured beads and black beards were used for this purpose.

The students were encouraged to form the letters with these aids along with the correct pronunciation. Individualised instruction was possible as the class strength was smaller.

Model writing of the poem and paragraphs of a lesson were taken for copy-writing. The students were encouraged to write neatly and correctly along with the punctuation marks

VOCABULARY IMPROVEMENT

Word-play was another activity. Words ending with Ra, Ka, Ga, Ma were introduced. The students were encouraged to read and write. Similar words starting with Am, Kam, Gam, Cha, Ta, etc , were written by the students.

To enhance the vocabulary achievement, the students were introduced to "sight words," i.e., words associated with cards and pictures New sight-words were added slowly "Cross-word puzzle" was another game for the students to search for the accurate letters to form the words. Students in two groups play the game to form the words Thus, the word-power was enhanced.

For the primary students, understanding the meaning of the words is the most important aspect of language-learning Through words, the concepts enter the area of social communication

DICTATION

Dictation is considered as a skill in the psychomotor domain This was another activity which was frequently used with a variety of words—simple known words, complex conjunct words, textual and non-textual, etc. The students tried to write the correct letters and words, sentences along with punctuation marks. This activity enhanced their competency about the alphabets and words. Immediate feedback helped them to identify their mistakes.

GROUP-COMPOSITION

(i) Group-composition is a goood example of a classroom activity where the classroom becomes a writing workshop. Through group-interaction, the students participate in the picture-composition and compose sentences and paragraphs. These students write them either on the blackboard or in their pages

This activity helps the students to select the appropriate ideas It teaches them the skill of organisation. The students can act as a "scribe."

(ii) "Sequencing a story" helps the students to focus on the overall organisation, to form a logical sequence of ideas and to become a creative writer Through simple stories they were asked to sequence the story in the order

(iii) "Guided composition" was another variety. Pictures, free expression on familiar objects, paragraph-writing on a given topic also needs the organisation skill for the students. The non-masters of class III and IV composed sentences related to a topic like "My favourite sweets," or "My best friend," or "My pet animal" or "flower." This activity encourages the students to think logically, accurately and organise their thoughts in the form of a group of sentences.

(iv) Stories are composed based on the unfamiliar picture-charts. This activity had a focus on their imagination. Students collectively composed the stories by observing the objects and animals in the charts.

(v) Writing answers to few simple questions like, the name of the students, the name of the school, the parents and their friends was another activity. The students eagerly responded to these questions Feedback was given to correct their spelling-mistakes.

Words with prefixes, suffixes, antonyms, synonyms, plural, singular, gender, sentence formation were taught as a part of teaching-learning activity.

Every session was pre-planned to carry out the child-centred activities and the competencies at the end of which evaluation, was done. The students were encouraged to participate actively. In these sessions only the non-masters were drawn out from their classrooms for the above said activities. Thus, individualised instruction was possible towards each non-master.

These varied activities were carried out till April end

Post-test

During the first week of May a post-test was conducted. Class-wise question paper-cum-answer booklets were prepared The maximum marks alloted to the test items was 25 About 45 minutes of time-schedule was fixed for these tests. Dictation was one of the compulsory item of the test.

In this achievement test, after scoring, significant shift in the pattern of achievement was observed. The data for both the pre-test and the post-test is given below.

I	A	Pre-test for 25 Marks	Post-test for 25 Marks
1	M1	6.5	21.5
2.	F2	4.5	16.0
3	M3	4.5	16.5
4.	F4	3.5	17.5
5.	F5	10.5	20.0
6	M6	12.0	18.0
7.	F7	12.0	22.5
8.	F8	8.5	19.5
9	M9	10.5	21.0
I	B		
1.	M10	6.5	20.0
2.	M11	7.5	20.5
3.	M12	6.0	17.5
4	M13	13.0	24.0
5	M14	8.5	22.0
6.	M15	12.0	22.0
7	F16	14.5	20.0

Pre-test = 35.12 per cent Post-test = 79.6 per cent

II	A	Pre-test for 25 Marks	Post-test for 25 Marks
1	M1	5.0	17.5
2	M2	6.5	14.0
3.	M3	5.0	16.0
4.	F4	5.0	16.5
5	F5	2.0	23.5
6.	M6	6.5	19.0
7.	M7	3.0	15.0
8.	M8	5.5	23.5
II	B		
1	M9	9.0	18.5
2.	M10	13.0	21.5
3.	F11	4.0	15.0
4	M12	9.5	20.5
5.	M13	6.0	18.0

Pre-test = 24.6 per cent Post-test = 76.44 per cent

IIII	A	Pre-test for 25 Marks	Post-test for 25 Marks
1.	F1	8.0	17.0
2.	M2	7.5	8.5
3	M3	6.5	19.0
4.	M4	5.0	18.5
5.	M5	7.0	21.5
6.	M6	5.0	18.5
7	M7	9.5	18.0
III	B		
1	M8	3.5	10.5
2.	M9	3.5	9.0
3.	F10	6.0	15.0
4	M11	4.0	5.0
5.	M12	10.0	20.0
6.	F13	2.0	19.0
7	F14	5.0	18.0
8.	F15	7.5	21.0
9.	F16	8.0	22.0
10	F17	8.5	22.5
11	F18	6.5	15.5
12.	M19	10.5	24.5

Pre-test = 26 per cent Post-test = 68 per cent

IV	A	Pre-test for 25 Marks	Post-test for 25 Marks
1.	M1	7.0	11.5
2.	F2	4.0	11.0
3	F3	10.5	15.0
4	F4	5.5	11.0
5.	M6	7.5	19.0
6.	M6	4.0	18.5
IV	B		
1	M7	11.0	23.0
2.	F8	15.0	22.0
3	M9	8.5	14.5
4	M10	15.0	25.0
	Pre-test = 26 per cent		Post-test = 68 per cent

FINDINGS

Class I: It was found that tremendous improvement was found in the performance of these 16 non-masters The average performance in the pre-test is 35.12 per cent while that of the post-test is 79.60 per cent.

Class II. All the 13 non-masters showed improved performance The average performance in the pre-test is 24.6 per cent and the post-test is 76.4 per cent.

Class III: Out of 19 non-masters, only 2 students did not show much improvement. All the remaining students showed marked performance in the post-test. The average performance in the pre-test is 26 per cent and the post-test is 68 per cent.

Class IV. Out of the 10 non-masters, 4 students achieved remarkably well. While the average performance in the pre-test is 35.2 per cent the post-test is 68.2 per cent. Three students did not show expected improvement.

Thus, the total performance of class I and II non-masters are near the target, i.e., the mastery level (79 per cent and 76 per cent) respectively. Thus performance of class III and IV non-masters is less, i.e., 68 per cent and 68.2 per cent and can be named as "near-masters."

The reasons for lesser achievement in class III and IV may be attributed to the accumulated slowness of these learners over the period of 2 or 3 years. If, the frequency of sessions for them is increased, due to the continuous activities and individual attention in the language, they may improve their achievement level, in the succeeding years. Thus, mastery level achievement will be 100 per cent in the primary section.

(i) Gender Performance

If we take the male-femal ratio in class I (9 + 7) the achivement score of pre-test is 36 per cent and 33.68 per cent showing a slightly better performance of the boys over the girls. In the post-test also the boys did well securing 82.4 per cent while the girls secured 76 per cent.

In class II (9 + 4), the pre-test achievement score of the boys is 29.2 per cent and that of the girls is 14 per cent. The post-test achievement is similar—74.8 per cent for the boys and 55.12 for the girls. Thus the boys performed better than the girls

In class III (11 + 8) there is not much difference between the achievement of the boys and the girls in the pre-test. They are 26 per cent and 25 6 per cent respectively. But in the post-test boys achieved 52.8 per cent as agaianst the girls achievement of 68 per cent. Thus, the girls in class III achieved better than the boys.

In class IV there is not much difference between the boys and girls (6 + 4) in the pre-test. It is 35.2 per cent and 35 per cent respectively. In the post-test the boys performed better than the girls securing 57.6 per cent as against 45 per cent for the girls.

(ii) Socio-Economic Factor

When we consider the socio-economic background of these students—whether they belong to the deprived sections of the society, parents' education and income, we come across certain facts.

(a) Out of these 58 students, 6 students belong to SC and 8 students belong to ST. It means that 24 per cent of these non-masters belong to the deprived category in the society. The boys-girls, (35 and 23 respectively) ratio is 61 per cent and 39 per cent

(b) Regarding the educational level of their parents, mothers' education stretches from VII standard to M.A. But majority of these mothers have education upto S.S.L.C very few mothers have B.A. or M.A.

(c) Regarding their fathers' education, it also stretches from S.S.L.C. to M.A. or M.Sc.

(d) About the occupation of these fathers, it varies from peon, attender, driver to engineer, lecturer and advocate. Interestingly, most of these mothers are housewives, except 5 or 6 of them are clerks, attenders, stenos or teachers. The income of the fathers vary from Rs. 3,600 to Rs. 72,000. With very few of them in the lower and upper ladder, most of them are in the middle ladder. Thus, the socio-economic factors have very little effect on the education of these students.

(iii) Language Spoken at Home

Another factor noticed during the conversation among these students is the language spoken at home Most of them have Kannada as their parents' language, while very few of these students have mothers/fathers whose mother tongue is either Telugu or Tamil This factor might have little influence on the non-mastery of their words

IMPLICATIONS OF FINDINGS AND SUGGESTIONS

Thus, the language holds a key-position in the elementary stage Even though the students are good at listening and speaking, they find it difficult when reading or writing skill is tested

It was found from their class-teacher that most of these students were equally non-masters in other curriculur areas like mathematics and English.

The test score clearly show that the organisation of the teaching-learning activities directly influence the levels of the learner achievement.

Keeping in mind the non-masters, a systematic, meaningful, competency-based teaching-learning activities have to be planned. Joyful, learner-oriented, play-way methods and activities will enhance the mastery level of the students

It was found that during the pre-test almost all these non-masters were unable to write their names in Kannada In the post-test they had written their names in Kannada with a few mistakes.

These students need constant attention by the teacher, which may not be possible in a regular class situation. It is proved that individualised attention enhances their mastery level.

A clear-cut programme may be chalked out in the beginning of the academic year about the non-masters If everyday the non-masters are given extra session with individualised instruction, within a year their number will be reduced to zero

By providing extra reading materials (library facilities) during the language periods in the form of Kannada short story and rhymes books, the achievement level will be enhanced among the students.

Thus, modified teaching-learning activities for the non-masters help in achieving the mastery level. Depending on the local need and the type of the problem, the class room teacher can suitably modify the teaching-learning strategies to achieve 100 per cent mastery level among their students. Once the students learn the language effectively, the hurdle of the drop-outs in the universalisation of elementary education can be minimised This methodology can be followed by every teacher to clear the hard spots and make learning joyful in the primary classes.

Child-centred Activity-oriented Competency-based Teaching-Learning Strategies in Mathematics in Class I

R. Prema

INTRODUCTION

Learning is a joy when learners are involved in activity Competency-based teaching gives more stress on child-centred activities. The three types of interactions were kept in mind while implementing competency-based teaching in class I in DMS attached to RIEM during the academic session 1995-96.

1. Learner-Teacher-Interaction (Known as guided learning)
2. Learner-Learner-Interaction (Known as inter learning)
3. Learner's Self learning

While implementing competency-based teaching it has to be seen that self learning takes place. If self learning is not possible, then inter-learning and finally guided learning can take place. MLL refers to achievements of a set of expected competencies at the level of mastery by practically all children during the period of primary/secondary/higher secondary level. Children have basically the potential to learn upto the mastery level But the potential can be realised only through well planned joyful child-centred activities keeping in mind the age, aptitude and ability of the child From this are we not realising the importance of activity-based child-centred learning? Now, let me explain the competencies to be mastered by all students, the various activities related to each competency and the difficult competencies which are not achievable by all the students

TYPES OF COMPETENCIES/SUB-COMPETENCITES

The competencies which are to be mastered by class I students are divided into five major areas. "Understanding of whole numbers and numerals" is the first The competencies which come under this are

Area	*Competency Number*	*Competency Description*	*Child-centred activity-based approach followed for each sub-competency*
1	2	3	4
1 Understanding whole numbers and numerals	1 1.1	Counting 1 to 20 using objects and pictures	Children counted beads, sticks, stones, pillars, benches, students
	1.1 2	Recognising numerals and match numerals to the numbers from 1 to 100	Reading the number made by the number cards on the board Recognising the numeral written on the slate
	1 1 3	Identifying zero as representing nothing or the absence of objects in a collection	Finding the difference number between an empty box and a box with beads
	1.1.4	Demonstrate the understanding of place value by expanding numbers from 10-20 into tens and ones and by expressing the expanded form as a two digit numbers	Threading 10 beads by the children and keeping aside the remaining and telling the two digit numbers and vice versa
	1.1.5	State the place value of the digits in the numbers 10-20	Identified as hard spot and shifted to next class
	1 1.6	Arrange numbers from 1 to 100 in ascending and descending order	Number cards from 1 to 10 were arranged in ascending or descending order.
		Sub-competency Arrange numbers from 1 to 29 in ascending and descending order.	Calender cutouts brought by the students were arranged in the desk in ascending and descending order
	1 1.7	Identify the numeral preceding and succeeding any given numeral between 1 to 100	Numbers cards put on the board First they were asked to give successor for a given number displayed on the board.
		Sub-competency numbers from 1 to 20	They were asked to give a preceding number for a given number displayed on the board. Numbers written on slates were also used
	1 1.8	Compare the numbers from 100 using the words more than, less than, the same as, greatest, least	Asking the children to pick up beads for two given numbers Ask the children to pair the beads such that

1	2	3	4
			one from one group is paired with one from the other group. When they are being paired the students who was having any left out beads than that number corresponding to his was greater If there was no left out then both the numbers are same If one or more than one bead is left unpaired that group of beads represent the larger number Encircling the larger number from 1-50 first and then 50-100.
2. Ability to add, subtract, multiply	2.1.1	Ability to add whole numbers Addition of numbers 0-18 with sum not exceeding 18. Sub-competencies 1. Two numbers whose sum not exceeding 9 2. Two numbers whose sum not exceeding 18	Using beads, sticks, stones fingers, addition was done for two numbers whose sum did not exceed 9. For example keeping a collection of beads say five and two putting them both together and counting the total number of beads.
	2.1 2	Adds two numbers mentally with sum not exceeding 9.	
	2 1 3	Subtracts numbers from 0-18 to separate smaller number from a larger number and to find the difference of two numbers	Using beads sticks, stones fingers, subtraction was done for numbers from 0-18 From a known collection of beads a given number of beads were taken out.
	2.1 4	Subtract mentally one single digit number from another single digit number.	
	2.1.6	Solves daily life problems involving additions and subtraction skills in 2 1 1	Giving examples of simple daily life problems.
	2.1 7	Solves daily life problems mentally involving	

1	2	3	4
		addition and subtraction skills as in 2 1 2 and 2 1 4.	
3 Ability to use and solve simple problems of daily life relating to units of money, length, mass (weight), capacity, area and time.	3 1.1	Recognise coins and currency notes of different denominations	Divide the class into groups Keeping the collections of coins and asking each one of the students to pick one coin. Doing the coin printing for both sides of the coin in their note book and read the number on the coin from the impression
	3.1 2	Uses non-standard units to measure length of object in immediate environment.	Measuring the length and breadth of the room with their foot and hand span
	3 1 3	Uses non-standard units to weigh objects in immediate environment using a toy scale/pan balance.	The children make a toy balance using bottle caps, ice cream cups, etc, with the help of their parents
	3 1 4	Uses non-standard units to measure capacity	Using small container measuring water or any other liquid. To find out the capacity of a given vessel using different sized small containers
	3 1.5	Names days of the week in sequence.	Through some rhymes like "Solomon Grundy born on "Monday," "Monday's child is fair of face."
5. Understanding of geometrical shapes and special relationship	5.1.1	Recognise and names the four basic shapes, triangle and squares	Keeping the collection of cutouts of different shapes (circle, triangle, rectangle and squares) and asking them to group similar shapes and deducing the properties
	5.1.2	Draws free hand circle, triangle, rectangle and squares to demonstrate understanding of the basic properties of the four shapes	
	5 1.3	Recognise and classify various solids in the environment on the basis of their shapes.	

The teacher conducted numeracy readiness test before the children had learnt counting by saying the rhymes like "One, two, three, four, five, once I caught a fish alive" etc., the children were able to say one to ten in order The children were provided with concrete objects like stones, sticks, etc. These objects enabled them to count through one to one correspondence. While the children were counting, the corresponding number was written on the board. This helped them to recognise the number. After making them thorough in recognising the number by various activities by using slates, number cards, old calenders, the children were made to write the numbers from 1-9.

The teacher helped the students to understand the concept of zero, i e., it represents nothing, or absence of objects. This was done using two boxes one empty and other filled with beads. Similar activities helped them to learn that competency.

The teacher had to do various activities to help the children to understand the place value by expanding numbers 10-20 into units and tens. The teacher gave a collection of beads from 10-19 to each child and they were asked to thread ten beads and keep the remaining separately. Thus the children were able to understand one "ten" and one "one" make 11 One child was asked to give corresponding number for the child's collection which was in terms of tens and units. This activity was repeated with stones, sticks, etc.

Since arranging 1-100 in descending order and ascending order is difficult for the children, the numbers from 1-10 were taken. Activity like calendar cutouts, number cards writing in slates in the class by each child. The teacher gave each child a slate with a number on it. First they were asked to stand in ascending order with their slates Children were asked to reverse the slate, so that the number was not seen. The other children were asked to give the missing number.

To help the students to understand the concept of comparison of numbers, two children were called and provided with a set of beads each. When the difference in quanity was seen, they immediately said which one was having larger number of beads. But when the collections appeared to be more or less same, they were aked to count by pairing By doing one to one correspondence, they were able to say which of the collections was greater Concrete objects were used to add two numbers whose sum did not exceed 18. The concept of "putting together" was stressed while adding two numbers. Addition was introduced through concrete objects.

While teaching subtraction the concept of "taking away" was stressed It was introduced through concrete objects Mental sums for addition and subtraction were given

For introducing the money concept actual coins were used The coins were put together (5 paise, 10 paise, 20 paise, 25 paise and 1 rupee coins) The class was divided into groups and each group was given a packet containing different types of coins such that each student will get one coin Each child was asked to read the numeral which was on that coin. Then the teacher showed each coin to all the children. While she was showing the children who were having the similar coin came forward and showed the coin to other children Then the teacher said the denomination of the coin and the child who were having the same coin came forward

The children were able to measure different lengths using stick, span, foot, etc. Using the toy balance the children were asked to weigh small bottle caps using beads. Using small caps and water children were asked to measure the capacity of tumbler, mug, etc

To make them learn the days of the week the children were asked to sing rhymes like "Monday's child is fair of face," "Solomon Grundy born on Monday," etc.

ADMINISTRATION OF DIAGNOSTIC TESTS

After helping the children to learn each competency through various activities, the children were tested using competency wise, teacher made test materials to see whether each child had attained the mastery over each competency or not

Test items were formulated based on competencies.
Equal wightage was given to each competency which were included in the test.

The teacher was conscious of the fact that a child's mastery over a specified competency was not to be compared with that of others as it was done in earlier days. The test paper was prepared so as to test the mastery or the non-mastery over that competency and was administered

CLASSIFICATION OF MASTERS AND NON-MASTERS

Suppose five items for a competency were given, in an ideal situation, the child has to secure 100 per cent marks. But for practical purposes if the child is able to clear 80 per cent of the items, i.e., 4, then he/she should be considered as a *master*. If it is below 80 per cent then he/she is considered as *non-master*. The results were tabulated as in the following table

Diagnostic test					After Remedial Measures	
Competency	Competency/ description	Total no. of students	No of masters	No of non-masters	No of masters	No of non-masters
1	2	3	4	5	6	7
1 1.1	Counting 1-20	31	23	08	27	04
1.1 2	Recognising numerals from 1-100	31	22	09	26	05
1 1 3	Identification of Zero	31	27	04	29	02
1 1 4	Understanding of place value by expanding	31	16	15	21	10
1 1 6	Arranging in in ascending or descending order	31	16	15	21	10
1.1 7	a. Writing successor	31	24	07	27	04
	b Writing precedessor	31	16	15	21	10
	c. Writing in between numerals	31	16	15	21	10
1.1 8	Comparison of numbers	31	16	15	21	10
1 1.9	Writing numeral 1-100	31	25	06	27	04
2 1 1	Addition of two numbers whose sum not exceeding 9.	31	22	9	25	06
2 1 2	Addition of two numbers mentally with sum not exceeding 9	31	23	8	29	02
2.1.3	Subtracts numbers from 0-18	31	22	9	28	03
2.1 4	Subtracts metally one single digit number from another single digit number.	31	23	8	29	02
2 1.6	Solves daily life problems involving additions and subtraction	31	23	8	27	04
2 1.7	Solves daily life problem mentally involving addition and subtraction.	31	22	9	27	04

1	2	3	4	5	6	7
3 1 1	Recognises coins and currency notes	31	29	2	As these compentencies were based on real life situations most of the children perform well in the competencies except 5 1 2	
3 1 2	Uses non-standard units to measure length	31	28	3		
3.1 3	Uses non-standard units of mass to weigh objects	31	29	2	Here the understanding of the basic properties of the four was tested The activities to consolidate these competencies were repeated again and again.	
3 1 4	Uses non-standard units to measure capacity	31	29	2		
3 1.5	Names days of the week in sequence	31	28	3		
5 1.1	Recognises and names the four basic shades	31	29	2		
5.1.2	Draws free hand circle, triangle and and square	31	27	4		
5.1 3	Recognises and classifies various solids	31	29	2		

When the teacher finds that each competency is mastered by 80 per cent of the students he/she can proceed to the next competency Along with that remedial instruction is to be followed for the children who have not attained mastery over that competency. For non-masters second shots and multiple shots are to be given after giving proper remedial instruction.

COMPETENCIES WHICH ARE ACHIEVABLE AND DIFFICULT TO ACHIEVE

From the data given above the difficult competencies are (1 1.4) understanding the place value by expansion of a two digit number, (1 1.6) arranging in descending order, (1 1 7) (b) identifying the predecessor of a number, (1 1.8) comparison of numerals. Attaining the mastery level in the above compentencies by all children is very difficult. Different types of remedial instruction and work sheets help them to achieve them at mastery level

REMEDIAL MEASURES UNDERTAKEN

Remedial measures are of different types The teacher asked the master in achieving that particular compentency. The children were called near the table and individual instruction was given Activities with concrete objects were repeated.

1.1 4 Activities with concrete objects were repeated, e g., for the competency place value, the objects need were changed to sustain interest and to learn joyfully. Each non-master was given individual attention while performing the activity The teacher gave a number, e g., 14 The non-master was asked to pick the same number of beads, sticks, stones, marbles, coins in sequence so as to consolidate the concept of 10+. Later he/she was aked to classify the objects into a group of ten and the rest 4 in another group When a variety of objects were given and practice was given for all numbers from 11-19, the non-masters learned the competency

The activity in reverse was also given, e g non-master was asked to recognise the number that represented the two groups, i. e. 10 and 4.

1.1 7 Calendar cutouts of numbers ranging from 1 to 9 were given to the non-master. He/she was asked to arrange them in ascending and descending order. Here also variety was given by using numbers written on slates or ready made number cards These activities helped the non-masters to locate the missing number in a sequence of numbers

1.1.8 A pair of consequent numbers like 2, 3 were written on the board, or on the slates held by two children or number cards put up on the flannel board. The predecessor number was covered and the non-masters were asked to tell the number. This activity was repeated with other pairs like 3,4; 4,5; 5,6,.. .19,20 Similar activities were done for successor numbers also. This helped the non-masters to master the competency.

INTERESTING SITUATION CONFRONTED DURING THE IMPLEMENTATION OF COMPETENCY-BASED TEACHING

When the children were asked to find a number which comes immediately after a given number the children were able to say that number quickly. But when the children were asked to give the number that precedes a given number they found it difficult. They could not give (almost 75 per cent of the children) the predecessor number as easily as they could give the successor number.

The teacher put two number cards on the board. Then the predecessor was removed after reading both the numbers. Then the children were asked to give that number. The same activity was done with all the numbers from 1 to 20 The children were given slates with one number on it The child having that number on his/her slate is to stand facing the class, displaying the number After that the child who had the predecessor on his/her slate was to come and stand to his/her right so that both the numbers on their slates are in proper order Similar activities were done to help the child to master that competency.

The numbers 1-9 were given in a shuffled manner For exmaple, 9 4 6 8 7 3 2 5 1 The children were asked to write in ascending or descending order. Most of the children wrote them by rote memory from 1-0 when the clue (1) was given. They did not compare the numbers to decide which should come after what. They even wrote 10, even though it was not given.

CONCLUSION

There is no doubt our children becoming masters in each competency if we follow the competency-based, child-centred activities in our teaching-learning strategies

This has already yielded results. But a regular and systematically planned activity list and corresponding worksheets are to be prepared As these work sheets are need based and localised, the subject teachers of one school have to plan activity books and, arrange then in the order of increasing difficulty This will standardise the teaching/remedial work Additional activities catering to masters are also to be planned

Competency-based Teaching in Mathematics: Evidences from Primary Classes

Rekha Johnson, Usha Sharma and Santosh Sharma

INTRODUCTION

The New Education Policy (1986) and modified Programme of Action (1992) recommended that "Minimum Levels of Learning be laid down for each stage of education" As a follow up action of NPE (1986) and POA (1992), MHRD formulated Minimum Levels of Learning for Primary Classes in 1992, which were revised in 1995, on the basis of feedback from experimental try out. Minimum Levels of Learning is an approach to achieve the objectives of universal primary education. In this approach, objectives of learning have been stated in terms of competencies, which are the terminal behaviours The terminal competencies have been delineated into simpler process competencies. It is emphasised that all children must achieve Minimum Levels of Learning. The MLL approach suggests child-centred instructional strategy related to child's experiences and needs. Evaluation should be made while teaching is still fluid, so that corrective measures could be taken in time. Remedial instruction have also been recommended for low achievers. In operational terms, it states that "80 per cent or more children master at least 80 per cent of the prescribed learning levels, taking 80 per cent as the criteria."

Other assumptions underlying MLL are.

(1) MLLs reduce the load of factual learning without compromising on goals of primary education.

(2) Ensure the acquisition of basic competencies and skills to such a level where they are sustainable, and would not easily allow for relapse into illiteracy.

(3) Mastery learning by all—bright, average, below average.

(4) Performance goals and objectives are realistic and achievable by all learners

(5) Learning continuum is maintained, where the units are sequenced

hierarchically so that the clusters of competencies in one unit build up as directly as possible on the competencies in the preceding unit

In recent years, MLL programme has gained national attention Some of the states have implemented MLL programme with great success MLL programme was introduced in Demonstration School, RIE, Ajmer in the academic year 1995-96, in all the classes I to V of primary section The present study examines the processes and outcomes associated with implementation of MLL

RATIONALE

Mathematics, has a sequential-hierarchical structure, where mastery of first competency is prerequisite to learning of second competency and so on This sequence of prerequisite relationships exists between units and also within a unit Therefore, it is reasonable to assume that mastery of first competency is tested and ensured before moving on to the next competency If early learning deficits are prevented, there is less chance that failure will occur and that special intervention will not be needed in higher grades Learning continuum across the classes and within a class, where the units are sequenced hierarchically, will increase the sustainability of learning objectives. Competency-based teaching also presumes that instructional strategy has an inbuilt feedback and evaluation mechanism. Based on this rationale, a model for competency-based teaching was evolved

THE MODEL FOR COMPETENCY-BASED TEACHING

The competency based teaching has three major components.

1. Competencies
2 Instructional strategy
3 Evaluation.

1. Competencies

The first step in competency-based teaching is to define the competencies. The other components of teaching, then, build upon these pre-defined competencies. Competencies are defined in terms of pupil's behavioural changes These behavioural changes should be specific, observable and measurable. In this model, the competencies have been taken from the revised MLLs developed by NCERT In the MLL brochures, the competencies have been stated as terminal behavioural changes, which have been delineated into simpler process competencies. However the competencies have not been arranged according to instructional sequence Competencies have been formulated area wise The areas (content) through which competencies are to be developed are·

- Whole numbers
- Four Basic Operations on whole numbers
- Measure of Money, Length, Mass, Capacity, Perimeter, Area, Volume and Time.
- Fractions, Decimals and Percentages
- Geometrical Shapes and Spatial Relations

The competencies have been stated in terms of content and pupil behaviour For example,

- Writes numerals from 1 to 20 in sequence
- Identifies numerals that come before, after or between any two numerals
- Expands numerals from 1 to 20 in terms of ten's and one's.

Within an area, there is learning continuum across the classes. Competencies stated under each area for classes I to V have sequential pre-requisite relationship. Learning continuum increases the sustainability of these competencies. Within a unit in a class also competencies have been arranged in hierarchical order, the next higher competency builds upon the lower competency and requires its mastery as prerequisite

Since, children learn same area from class I to V at different levels complexity and competencies at these levels have sequential pre-requisite relationships, children may not forget what they have learnt ealier. Some permanancy in learning is expected and pupils will not get back to illiteracy.

2. Instructural Strategy

The first question that arises when one wants to formulate and design an instructional strategy is "what type of instructional strategy is most effective for achieving the desired objectives." The objective here is that all children master all pre-defined competencies

MLL approach suggests child centred method, where each child formulates and develops his/her own concepts through experimental learning. Individualised remedial instructions have also been suggested for low achievers.

In the present model for implementaion of MLL, child-centred approach of teaching and learning, using concrete objects and examples from everyday life has been adopted. The important aspects of this instructional strategy are

(i) Child-centred-instructional strategy is based on child's environment, experiences and development level Children learn by doing, observing and drawing their own conclusions

(ii) Activity-based-learning activities include manipulating concrete objects, projecting real life situaions, drawing, drama, making mathematical toys puzzles, etc. Activities are the basis of lesson development Children perform the activities.

(iii) Use of mathematical kit and other teaching aids—Mathematical kit is used wherever it is required, specially whenever new concepts are introduced Other teaching aids like blackboard, models, charts, etc., are also used. Teachers are encouraged to prepare their own teaching aids, such as number cards, objects of different shapes, toy currency, etc.

(iv) Questioning—Questioning is also an important component of teaching-learning process Reasoning skill is developed through questioning. Also students are helped to arrive at right conclusions through questioning.

(v) Pupil participation—To increase pupil participation, pupils are encouraged to perform activities, ask questions and work in groups Learning situations are made relevant to the child. Real life situations are projected in the form of dramas, plays, etc., where children play different characters and learn through play way method.

(vi) Instructional strategy has inbuilt evaluation and feedback mechanism. During classrooom interaction, students are informally evaluated using teacher's observation. The students are corrected, wherever they make a mistake. The misconceptions are removed by reteaching the concept by a modified method

3. Evaluation

The thrid aspect of this instructional model is evaluation. In MLL approach, evaluation is an integral part of teaching learning process Evaluation should be used to improve teaching learning process. Another purpose of evaluation in competency-based teaching is to ensure that all students have mastered the given competencies.

MLL approach suggests that evaluation should be made at the end of each competency, i.e , after the instructions have been provided and students have learnt it. However, the number of competencies is large and these are integrated in teaching process

For example,

Competency I – Recognises numbers 1 to 20
Competency II – Speaks numbers 1 to 20
Competency III – Writes numbers 1 to 20 in sequence

Competency IV – Reads numbers 1 to 20

These competencies can neither be taught, nor evaluated separately and independently Also it is not feasible to conduct a formal test at the end of each competency Therefore, three types of evaluations have been suggested in this model,

(i) Formative evaluation
(ii) Intermediate summative evaluation (monthly test)
(iii) Diagnostic evaluation.

(i) Formative Evaluation is an integral part of teaching-learning process and is used for guidance only Such an evaluation is made by the teacher while teaching in the classroom Tools and techniques of evaluation include oral questions, student's record, observation by teacher. Evaluation is in the form of remarks and suggestions. Formative evaluation is not used for classification or grading Therefore it is not necessary to assign marks/grades or rank order position to pupils on the basis of this evaluation. This evaluation is made to correct them, wherever they make mistake. Diagnosis of learning difficulties can be made during formative evaluation also.

(ii) Intermediate Summative Evaluation has been suggested in the form of monthly test. Monthly test includes all the competencies taught during one month Usually five or six items are based on one competency. This way, a test of 30 items tests five or six competencies. Tests are written/oral, depending on the age group of students and the nature of competencies These tests are prepared, administered and scored by teachers. Answer scripts are shown to the students to provide them the feedback. These tests also indicate the "weak spots" and the competencies not mastered by pupils.

(iii) Diagnostic evaluations—"Weak spots" are indicated in the competency-based tests (achievement tests) To diagnose, evaluation is suggested. In diagnostic test, items are based on errors committed by students. Diagnostic tests help in diadnosing the specific errors/learning difficulties of non-masters. Diagnosing is content based, i.e., learning difficulties are related to subject. Other psychological, social, and physical problems are also diagnosed, if there is need.

4. Remedial Instruction

In this model, both individual and group remedial instructions have been suggested depending upon individual or group errors Remedial instructions have been suggested for those who fail to master the given competencies

EXPERIMENT

Implementation of MLL programme using this model in primary classes of Demonstration School of RIE, Ajmer.

Sample

MLL programme was implemented in all the classes I to V of primary section. Sample included all the students enrolled in classes I, II, III and IV and V of this school Sample size is 203 (class I, 34, class II, 37, class III, 46, classs V, 47) Group is heterogenous, i e , contains pupils of different ability groups in all the classes. In class I also, some children are with pre-school learning experiences while others are without such a training

Teacher

Teachers are subject specific. Mathematics is taught by mathematics teachers to all the classes. Two teachers taught five classes, in this case. An orientation programme was organised for teachers on "competency-based teaching " The model for implementation of MLLs, discussed above was explained and experimental designs and strategies were also discussed with teachers MLL model was introduced in school in regular classes and was fitted into the existing time schedule Teaching was done by regular school teachers All the competencies in one class were taught by one teacher

INSTRUCTIONAL STRATEGY AND EVALUATION IN ACTUAL CLASSROOM SITUATION

MLLs were introduced in Demonstration School for the first time and therefore teachers decided to follow competencies strictly according to MLL brochure without any modifications Instructional sequence was also arranged according to the sequence of competencies Experimental approach in teaching and learning using concrete objects and examples, as dicussed in the model was used Activities were developed by teachers Teaching aids included mathematics kit developed by NCERT, models, objects around, toys, etc. Activities also included drama, play and story involving numbers or money transactions Evaluation in the form of oral questions was made during classroom transaction However, the textbooks used were NCERT textbooks The competencies and sequence of competencies in textbooks differs from MLL booklet

Formal Evaluation was made in the form of monthly test Each test included five or six competencies On the basis of monthly test, pupils were classified as "masters" or "non-masters."

Criterion for this classification was 80 per cent correct, i e , those who answered 80 per cent questions correctly were classified as masters The non-masters were taught these competencies again, sometimes using a modified method. Remedial instructions were provided to non-masters in a cooperative learning situation, where masters also helped non-masters in achieving the desired objectives Remedial instructions were mainly instructions with a modified method, which were provided to the whole class with special attention to non-masters. Individual remedial instructions were also provided to pupils who were non-responsive in the group. Non-masters were again evaluated after remedial instructions

The tests used were teacher made achievement tests These tests provided some diagnostic data in terms of "weak spots" but these were not diagnostic tests in "technical terms."

The evaluation was recorded in the form of masters and non-masters after first teaching course and also after second, remedial teaching session.

RESULTS AND DISCUSSION

The main results of the study are shown in Table 1 and 2. Table 1 shows the performance of class I students on 21 competencies and Table 2 shows the number of non-masters after instructions (I) and also after remedial instructions (II). Perusal of Tables 1 and 2 reveal that we are far from our objective of 80 per cent students mastering 80 per cent competencies at 80 per cent criterion. Of the 21 competencies listed, only 12 competencies have been mastered by 80 per cent or more children even after remedial

TABLE 1
Number of Masters and Non-masters after Instruction I and after Remedial Instructions

Competency Numbers	*Competencies*	*Evaluation I*		*Evaluation II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
1.1.1	Counts objects and pictures (from one to twenty)	32	2	32	2
1 1.4	Represents no object in a collection by zero number of objects and recognises the symbol 0 zero.	22	11	26	8

Competency Numbers	*Competencies*	*Evaluation I*		*Evaluation II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
1.1.5	Writes numerals 10-20 corresponding to the numbers ten to twenty spoken and vice versa.	26	8	29	5
1.1.6	Speaks numbers from one to twenty in sequence (ascending order)	32	2	32	2
1.1.7	Writes numerals from 1 to 20 in sequence	28	6	31	3
1.1.8	Expands numbers from one to twenty in terms of "tens" and "ones"	28	6	31	3
1.1.9	Identifies the numeral that comes before, after or between any two numerals	21	13	28	6
1.1.10	Indicates understanding of ordinal numbers (first, second, tenth)	22	12	28	6
1.1.11	Cites difference between ordinal numbers and its corresponding cardinal numbers	17	17	26	8
2.1.1	Adds two single digit numbers (using two collections of objects)	30	4	30	4
2.1.2	Writes all addition facts (sum not exceeding 18) using two collections of objects and the symbols of + and =	28	6	28	6
2.1.3	Finds the missing addend to make an addition fact ☐ + 4 = 7, 5 + ☐ = 12	26	8	28	6
2.1.4	Gives addition fact of two given single digit numbers (sum not exceeding 18)	25	9	28	6
2.1.5	Finds out using addition facts two numbers whose sum (not exceeding 18) is the given number	26	8	28	6

Competency Numbers	*Competencies*	*Evaluation I*		*Evaluation II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
2.1.6	Subtracts a number from greater number (not exceeding 18)	27	7	27	7
2.1.7	Writes all subtraction facts using the process of taking away some objects from the collection (not more than 18 objects) and symbols – and =	26	8	27	7
2.1.8	Finds the missing numbers to make a subtraction fact 14 – ☐ = 2, ☐ – 3 = 4	24	10	25	9
2.1.9	Finds out two numbers whose difference is the given number ☐ – ☐ = 4, ☐ – ☐ = 2.	21	13	26	8
2.1.10	Writes the addition fact, using symbols + and = corresponding to the given 1 step simple problem involving = ion. 2 + 3 = _____	22	12	28	6
2.1.11	Writes the subtraction fact, using symbols – and = corresponding to the given one step simple problem involving subtraction 4 – 2 = _____	19	15	24	10
2.1.12	Forms a verbal problem in his/her style and language corresponding to the given + ion and – ion fact	12	22	12	22

instructions That is, 20 per cent or more children remain non-masters on about 43 per cent competencies even after remedial instructions. During first classroom teaching, only 5 competencies out of 21 listed, were mastered by 80 per cent or more students. That is 20 per cent or more children remained non-masters in about 77 per cent of the competencies. Figure 1 shows that the percentage of non-masters reduces significantly on some competencies after remedial instructions but on other competencies, number of non-masters remains almost the same Figure 1 also reflects that first instructions were not effective for learning some compe-

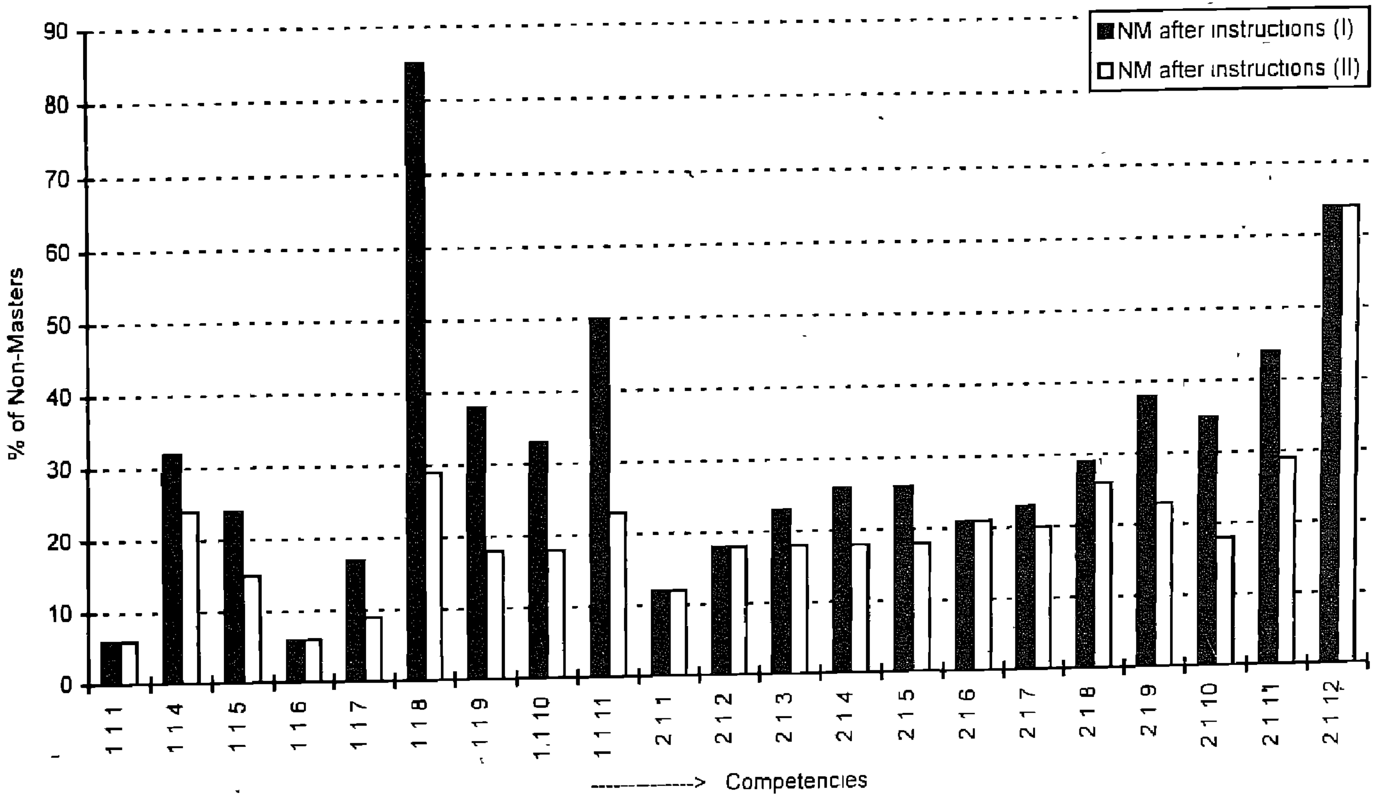


Figure 1. Showing percentage of Non-Masters after instructions (I) and remedial instructions (II) (Class I Mathematics)

TABLE 2
Percentage of Non-masters After Remedial Instructions
Class I (Mathematics) Total No. of students 34

S No.	Competencies	Non-masters after Ist instructions	Non-masters after remedial instructions	% of Non-masters after Ist instructions	% of Non-masters after remedial instructions
1.	1.1.1	2.00	2.00	5.88	5.88
2.	1.1.4	11.00	8.00	32.35	23.53
3	1.1.5	8.00	5.00	23.53	14.71
4	1.1.6	2.00	2.00	5.88	5.88
5	1.1.7	6.00	3.00	17.65	8.82
6.	1.1.8	29.00	10.00	85.29	29.41
7	1.1.9	13.00	6.00	38.24	17.65
8.	1.1.10	12.00	6.00	35.29	17.65
9.	1.1.11	17.00	8.00	50.00	23.53
10.	2.1.1	4.00	4.00	11.76	11.76
11	2.1.2	6.00	6.00	17.65	17.65
12.	2.1.3	8.00	6.00	23.53	17.65
13.	2.1.4	9.00	6.00	26.47	17.65
14.	2.1.5	8.00	6.00	23.53	17.65
15.	2.1.6	7.00	7.00	20.59	20.59
16	2.1.7	8.00	7.00	23.53	20.59
17.	2.1.8	10.00	9.00	29.41	26.47
18.	2.1.9	13.00	8.00	38.24	23.53
19	2.1.10	12.00	6.00	35.29	17.65
20	2.1.11	15.00	10.00	44.12	29.41
21.	2.1.12	22.00	22.00	64.71	64.71

tencies. For example, competency 1.1.8 (expands numbers from 1 to 20 in terms of tens and ones), was not mastered by more than 85 per cent students after first teaching session. Re-teaching with a modified method reduced the percentage of non-masters to 29.2. Similarly on competencies 1.1.7, 1.1.9, 1.1.10, 1.1.11, 2.1.10 and 2.1.11, the number of non-masters reduced by 50 per cent on re-teaching. The number of non-masters is significantly high (64.7 per cent) on competency 2.1.12, even after re-teaching. This also is a group difficulty. It may be concluded that teaching by appropriate method, reduces the number of non-masters significantly. If an appropriate method is selected and used during first classroom interaction, re teaching by modified method can be avoided and time can be saved. For all these competencies where number of non-masters is above 20 per cent, during first instructions, the skill and technical aspect of teaching may be looked into. There are about 6 per cent children, who have mastered only 2 competencies out of 21 listed, on first teaching and also after re-teaching. Re-teaching has not improved their performance. These children may be having individual learning difficulties For these children, diagnostic evaluation with respect to content and other psychological/social deficiencies is required

TABLE 3
Performance of students, showing number of Masters and Non-masters after instructions I and Remedial Instructions II
Class I, Total No. of Students 34, Mathematics

Competency No		3 1 1
Competency		Recognises coins of 10, 20, 25, 50 paise and of Re 1, Rs 2 and denomiations upto Rs 100
Instructions I	Masters	32
	Non-masters	2
After Remedial Instructions	Masters	32
	Non-masters	2

TABLE 4
Number of Masters and Non-masters after Instruction I and Remedial Instructions II
Class II, No. of Students 37, Mathematics

Competency Numbers	*Competencies*	*After Instructions I*		*Remedial Instructions II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
3.2 1	Makes an amount upto Re 1 by using varying collections of coins, using real or toy coins	31	6	35	2
3.2 2	Makes an amount upto Rs 100 by using varying collections of real or paper currency notes.	32	5	35	2
3 2.3	Finds the total value of 2 or 3 given coins (sum not to exceed 100 paise) (e.g., 50 paise, 20 paise, 10 paise = 80 paise)	30	7	32	5

Competency Numbers	Competencies	*After Instructions I*		*Remedial Instructions II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
3 2 4	Finds the total value of 2 or 3 given currency notes (sum not to exceed Rs 100)	30	7	31	6
3 2.5	Finds the difference between the values of two given coins/currency notes (no recognition) no value to exceed 100 paise/ 100 rupees.	30	7	32	5

TABLE 5

Number of Masters and Non-masters after instruction I and Remedial Instructions II

Class III, No of Students 39, Mathematics

Competency Numbers	*Competencies*	*After Instructions I*		*Remedial Instructions II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
3 3 1	Uses real or toy money in currency and coins in examples of 1-step daily transactions with values not exceeding Rs. 10.	27	12	30	9
3 3 2	Solves simple money problems using either addition or subtraction without conversion e g., Simple shopping accounts.	23	16	30	9
3.3 3	Solves mentally simple 1-step daily life problems involving paise in multiples of 5, 10, 20, 25, 50 upto Rs 1 with no regrouping.	26	13	30	9
3 3 4	Solves mentally 1-step daily life problems involving rupees where no number in the operation exceeds Rs 50 with no re-groupting.	24	15	27	12

TABLE 6

Number of Masters and Non-masters after Instruction I and Remedial Instructions II
Class IV, No of Students 46, Mathematics

Competency Numbers	*Competencies*	*After Instructions I*		*Remedial Instructions II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
3.4 1	Solves simple money problems with conversion using two of the four operations with factor (multiple/divisor) not exceeding 10 (e g, shopping accounts)	34	12	40	6
3.4 2	Solves simple buying and selling problems using unitary method.	43	3	45	1
3.4 3	Solves mentally 1-step daily life money problems involving either rupees or paise where no number in operation exceeds 50 using any of the four basic operations	37	9	42	4
3 4 4	Solves simple 1-2 step daily life problems of profit and loss.	43	3	45	1

This study also reflects upon the performance of students of classes I to V in one area Tables 3 to 7 show the number of masters and non-masters on various competencies under area "Measures of Money"

Table 8 shows the percentage of non-masters after first teaching session and also after remedial instructions In class III, the number of non-masters is significantly high. Even after remedial instructions, more than 20 per cent students have not mastered even a single competency out of four listed. Remedial instructions or re-teaching by a modified method reduce the percentage of non-masters (also see Figure 2), but these competencies still remain a group difficulty. Scenerio, however, is different in classes I, IV and V. In class V, 2 to 6 per cent students remain non-masters of various competencies after remedial instructions. The percentage of non-master before remedial instruction is as high as 45 per cent on competency 3 5 2 and 34 per cent on competency 3 5.4. This again suggests that re-teaching by a modified method reduces the percentage of non-

TABLE 7

Number of Masters and Non-masters after Instruction I and Remedial Instructions II
Class V, No. of Students 47, Mathematics

Competency Numbers	*Competencies*	*After Instructions I*		*Remedial Instructions II*	
		Masters	*Non-masters*	*Masters*	*Non-masters*
3 5 1	Solves simple money problems as in 3 4 1 (including profit and loss)	43	4	37	—
3 5 2	Interprets and prepares simple bills giving the rates and quantity upto 5 items	26	21	44	3
3 5.2	Computes the simple interest and the amount for the given principal, period and rate of interest.	31	16	45	2
3 5 3	Computes the simple interest and the amount for the given principal, period and rate of interest.	31	16	45	2
3 5.4	Solves mentally daily life money problems involving Rupees and paise (in multiples of 10) where no number in the operation exceede 100, using any of the four basic operation without conversion, regrouping or remainder and × ion and + ion by single digit	44	3	46	1

masters significantly. In class IV, also more than 80 per cent students have mastered all the four competencies after remedial instructions Before, remedial instructions their number is high on competency 5.4.1 (26 per cent) and 3 4.3 (19 57 per cent). In class I, the number of non-masters remains same (about 6 per cent) after first instructions and after remedial instructions It may be concluded that teaching with an appropriate method reduces the percentage of non-masters to about 5-6 per cent These 5-6 per cent students actually need further diagnosis with respect

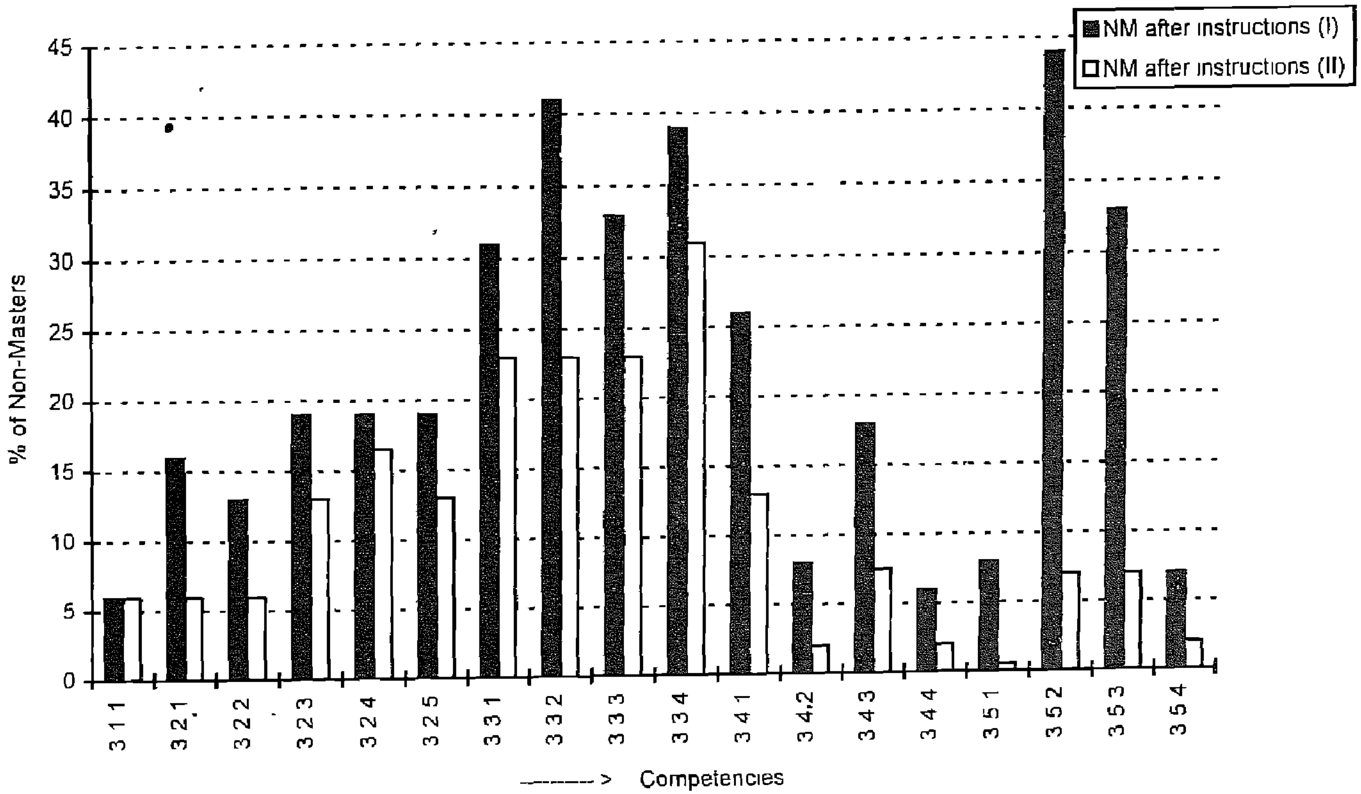


Figure 2. Showing percentage of Non-Masters after instructions (I) and remedial instructions (II) (Class I to V)

TABLE 8

Show Percentage of Non-masters After Remedial Instructions

S No	*Competencies*	*Non-masters after Ist instructions*	*Non-masters after remedial instructions*	*% of Non-masters after Ist instructions*	*% of Non-masters after remedial instructions*
1	3.1 1	2 00	2 00	5.88	5.88
2	3 2.1	6 00	2 00	16 22	5.88
3.	3 2.2	5 00	2.00	13 51	5 88
4	3 2 3	7.00	5 00	18 92	13 51
5	3 2 4	7.00	6 00	18 92	16 22
6.	3 2 5	7 00	5 00	18.92	13 51
7	3 3.1	12 00	9 00	30.77	23 08
8.	3 3.2	16 00	9 00	41.03	23.08
9	3 3 3	13 00	9 00	33.33	23 08
10.	3 3 4	15 00	12.00	38.46	30 77
11.	3.4.1	12 00	6.00	26.09	13.04
12.	3.4.2	3 00	1.00	6.52	2 17
13	3 4.3	9 00	4.00	19 57	8 69
14	3 4.4	3 00	1.00	6.52	2 17
15	3 5.1	4 00	0 00	8.51	0 00
16	3.5 2	21.00	3.00	44 68	6.38
17	3 5 3	16 00	2 00	34.04	5 88
18	3 5.4	3.00	1.00	6 38	2 13

to content difficulty and psychological/social difficulties If we analyse the competencies of class III, where number of non-masters is high, these competencies require solving the money transaction problems mentally. Upto class II, students are working with concrete objects and written numbers. Now, in class III, they have to perform abstract operations mentally, which require some practice and drill of working with mental images, that is, internalised abstract operations. Another aspect of instructional strategy which needs some discussions here is the remedial instructions used and the method of analysing learning difficulties. Remedial instructions were mainly instructions with a modified method, which were provided to the whole class with special attention to non-masters. Here, non-masters were asked to perform the learning task/activity and their misconceptions were not based on specific learning difficulties. These helped in removing the group learning difficulties Secondly, no diagnostic evaluation to analyse the nature of errors was made. The tools of evaluation were merely teacher made achievement tests which reflected the "weak spots."

CONCLUSIONS AND SUGGESTIONS

1 Use of appropriate instructional strategy reduces the number of non-masters significantly

2 The large percentage of non-masters after providing instructions (85 per cent to 35 per cent) reflects that teaching was not effective. This may be called instructional deficiency and not learning deficiency since the number of non-masters reduces by more than 50 per cent when the same competency is re-taught.

3. If teachers are trained to select and use appropriate and most effective method of teaching, re-teaching by a modified method can be avoided

4. The percentage of students requiring diagnostic evaluation and remediation, is actually 5-6 per cent only

5. Study also suggests that diagnostic tests may be used for these students and remedial instructions should be based on error analysis

6 The last point is whether "masters" be allowed to move to the next competencies or they should wait and help others till the non-masters also reach mastery-level If masters are not allowed to move to the next competency, their motivational level may come down.

Need for Action Research Approach to Improve Learning at Primary Stage

Kuldip Kumar

INTRODUCTION

Recent studies on learning achievement at primary stage in India and other countries have emphasised the need for empowering teachers to relate to learners' pedagogical requirements and to make the teaching-learning process rewarding for teachers as well as students.[1] Educationists all over the world have maintained that curriculum development and its effective transaction require research. on the ways in which children learn, what to teach and how to go about it; what requirements society makes of individuals; and so on Generally these problems are regarded to be the proper task of those who specialise in research. This kind of research, however, leaves many gaps in improving practice Often the problems in which the researchers are interested tend to be too far removed from practice, and consequently a long time elapses before the ideas and facts thus created find their way into practice.

Furthermore, the requirements of precision and quantification in basic research create a preoccupation with the kinds of problems which are often not related to crucial problems of practice. Another difficulty is that much of basic research relevant for educational practitoners—teachers, curriculum developers, supervisors—is inaccessible to them. They find it difficult to bite through the special research language and thus they use relative little of what is found out. Often useful techniques, ideas, facts discovered in areas other than eudcation are completely out of their reach.

It is also being realised increasingly that ideas and facts are more significant to those who have had a hand in discovering them, and that the scientific thinking which is an important part of research processes is much needed by those who teach As teachers are called upon more than ever to develop their own curriculum they need to think scientifically about curriculum and develop a more adequate way of using research data. Teachers need to learn how to determine rationally what to teach and which methods to use No matter what knowledge is generally available about students' needs, teachers must learn about the needs of their students. They need to learn about what works and does not work in their classrooms. And they need to learn what to use and how to use current research data

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[1] NCERT (1995). *School Effectiveness and Learning Achievement at Primary Stage—International Perspective* New Delhi. National Council of Educational Research and Training

For these reasons the action research approach to problems of curriculum and teaching is advocated in this paper Steps involved in the action research process are discussed For a framework to adopt the action research strategy which could be tried out in the context of the District Primary Education Programme to achieve its objectives including universal enrollment, reducing drop-outs and improving quality of learning in schools, the reader may see the report on NCERT Experiment in Action Research. [2]

EMPOWERING TEACHERS WITH RESEARCH PROCESSES—RELEVANCE OF ACTION RESEARCH

There is an urgent need for teachers either to develop in themselves, capability to take up research or to join hands with researchers to find practical solutions to problems of curriculum and teaching. The action research strategy has the potential to empower teachers either to become teacher-researchers or to work with researchers to become effective teachers, that is, teachers who understand their students' learning requirements and who adjust their teaching-learning strategy accordingly to promote student learning

Action research, as the term is used in this paper, is that research which is carried on by educational practitioners to solve their own problems. Thus defined it means, that such research deals with problems of immediate concern to teachers and curriculum makers. It means that, second, that research is a cooperative enterprise in which practioners and researchers together decide what to study and how to go about it. While the teachers are "experts" in describing the problems they need to study, the researchers can help with method of analysing these problems so that they become manageable for study. Changes in practice will come about by applying appropriate research techniques, by developing study designs and ways of handling data in such a manner that results are directly applicable to the problems at hand. Teaching is too busy an occupation to afford the luxury of studying things that are not of immediate practical concern. When people complain that teachers are not interested in research, this usually indicates a situation where teachers are aked to study problems that someone else thinks are important.

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[2] The NCERT experiment is under implementation in the NCERT Laboratory Schools in its four Regional Institutes of Education at Ajmer, Bhopal, Bhubaneswar and Mysore in India. The report is available from the Head, Department of Educational Research and Policy Perspectives, NCERT, New Delhi 110016.

It means, third, that the research tasks need to be practical, and not so complicated as to require intricate and prolonged studies before answers can be found. Practitioners are interested in changing practice: they can afford time and interest for research only as a means to improve practice, not for its own sake.

It means, fourth, that action research needs to aim at two things simultaneously· (a) to produce evidence needed to solve practical problems; (b) to help those who are doing the action research to deepen their insights as to what is involved in their task and to extend their orientation toward children—towards methods of teaching them or towards what is significant in content of learning.

Above mentioned characteristics of action research by no means narrow its field of usefulness. We are all familiar with the insufficiently tested principles that have served as a basis for recommending curriculum changes—that curriculum should be based on the needs of children, or that learning processes are affected by multiple factors such as ability, social learning, emotional health, physical conditions. Many new concepts and questions uncovered by recent research in areas other than education have served to throw light on the complex factors in learning and growing. The array of questions requiring further study before finding the appropriate practical solutions, however, is downright staggering—and sufficient to keep thousands of teachers and supervisors busy for years to come. At the end of this paper a few areas are suggested in which practical studies are sorely needed. The suggestions are made with a full recognition of the fact that actual research tasks by any action group probably will be on specific problems within the suggested areas.

STEPS IN THE ACTION RESEARCH PROCESS

The development of action research projects needs to proceed along certain steps which are dictated in part by the requirements of an orderly research process, in part by the fact that the "researchers" are learning while they go on, and in part because essentially an inductive procedure is indicated When teachers start with classroom problems as they see them, these steps are roughly as follows

1. Identifying problems
2. Analysing problems and determining some pertinent causal factors
3. Formulating tentative ideas about the crucial factors.
4. Gathering and interpreting data to sharpen these ideas and to develop action hypotheses.
5. Formulating action
6. Evaluating the results of action

Naturally, these steps are not usually pursued in a straight line. Problems change as they are analysed, and require new identification Data are needed to focus the problems by identifying causal factors, in determining action hypotheses, as well as in evaluation, and so on Generally, though, there is a sequence which it is wise not to reverse.

Step 1: Problem Identification

The first step in an action research sequence is to identify what concerns teachers have. This step is the most crucial of the whole sequences. Unless the problems to be studied come from the teachers themselves, their involvement in research is difficult to secure and identification with the problem is weak. But problem identification involves more than eliciting statement of concerns Teachers' statements may be quite a few steps removed from the teachers' real concerns or from their actual problem They may not have seen all the dimensions of their problems. They may make assumptions about causes which may lead to unfruitful solutions It is also their concerns and the conditions that surround them fully enough Therefore, one task of problem identification is to correct the perspective on the problem and to begin the process of bringing the cause of the difficulty into foucs. In other words, a diagnosis of the stated concerns is needed.

In addition to providing a starting point for beginning work, problem identification also serves to provide a diagnosis of the teacher. his/her skills, levels of perception, attitudes toward children and towards teaching, and especially of capacity to accept change in ideas and methods Different teachers bring to their concerns different dispositions. Some are shy and insecure, which makes it hard for them to accept new perceptions without fear and trepidation. Some are easily threatened by analysis and questioning To make these teachers productive, the steps to a fuller understanding of their problem need to be slower and, to avoid abrupt and threatening change, to be carefully formulated Other teachers bring to their problems definite and sometimes mistaken convictions. For these, tasks are needed which not only help develop a better view of the problem, but also change their viewpoints and break down their current stereotypes and misconceptions Teachers who face their task objectively can launch a scientific analysis from the start, while those who are naive about scientific processes need help in learning how to think scientifically.

These individual differences need to be taken into account in developing an approach calculated to make each person as productive as possible. It is as important to determine what blocks the teacher's perspective toward his/her problem as it is to diagnose the nature of his/her problem. Both must be considered in determining the next steps toward analysis and solution

Because of this double task in daignosing, problem identification needs to include enough conversation to learn about the teachers' situation and its limitations. The next steps are then consistent with the demands of the situation as well as with the needs and the capacities of the persons involved. Several conversations and some preliminary data gathering may be needed to take care of both these tasks.

Problem identification can proceed in several different ways. A problem can be identified in individual conferences. Supervisors can observe teachers at work and together with them can identify problems to work on. Indentification of concerns can be made in group meetings. When a start is made with group of teachers, some sort of formal problem census is needed in order to make certain that each individual starts on the problem as she/he sees it, is involved and works on something of concern to him/her It is necessary to talk with individuals or to get descriptions of classroom situations so that more specific aspects of the problem can be identified

Because awareness of difficulties is often sharper than awareness of goals and needed changes, a problem census can often take the form of identifying the "grips" and the difficulties Such questions as: What problems do you have?" "What difficulties do you encounter in your classroom?" "What are the things that you would like to change?" tend to bring more focused statements than do statements centering on goals

This inductive approach of starting with individual concerns instead of general problems has its weaknesses. One takes a chance of having too many dispersed problems. An integrated attack on general, significant problems is less likely to occur, or to occur as soon as one might wish. However, with some inventiveness in developing and organising these research activities, eventually such individual problems will cluster around larger and more significant problem areas.

Step 2: Problem Analysis

Initial problem statements are not necessarily an effective formulation for research and study. To provide teachers with a successful starting point for research process, the probelms need to fulfil certain criteria. First, the problems must be important to the person proposing them and at the same time must have significance from the standpoint of teacher's functions.

Second, the problems need to be manageable. Practitioners, for whom research itself is not a main driving force, will not have motivation sufficient for long drawn out research processes without the urgent incentive provided by getting immediate results Furthermore, complex problems may require complicated research techniques which may be beyond competencies of the person involved.

Third, the statements must reveal some fundamental dimensions as to causes and factors, so that solutions can be addressed to these fundamentals rather than to superficial phenomena.

For these reasons, it is necessary to conduct a problem analysis to discover the possible dimensions of a problem or project, to identify its crucial aspects and to focus it adequately. This step is quite crucial, because on its quality depends the tone of subsequent research as well as the quality of learning teachers derive from the process. If the ideas about the problem and what is involved in it are inadequately developed, usually "old horses" are placed in new positions and the experimental design of the research or for programme planning does not receive the new slant that it needs. When solutions are arrived at directly from the statement of the concerns, these solutions are usually rather stereotyped and fail to get at the root of the matter. The focusing of the problem is also a process that produces new insights for the teachers, and offers an opportunity to re-educate teachers.

Problem analysis involves several types of activities, depending on the difficulties shown in problem statements: an analysis of causes and consequences of the difficulties mentioned, an examination of the assumptions made, a study of the research data available, or securing some preliminary data in order to clarify the issue or to change teachers' perspective on the problem.

Problem analysis needs to deal with several difficulties. Often teachers' concerns are so complex and general, that they lack a specific focus. When this happens, the problem becomes unmanageable. In one school, some teachers wanted to study children's attitudes. A curriculum committee was interested in developing a sequence for the entire elementary school. Another group of teachers was interested in enhancing the achievement of the slow learners, looking upon "slowness" as one single monolithic quality The first problem is too vague. One needs to identify specific types of attitudes before designing ways of studying these attitudes. The second problem is too complex. One needs to examine the specific units on different grade levels before the questions of sequence can be attacked. The third problem suffers from too generalised a definition of the "slow learners" All of these problems require a clearer and more specific focus before fruitful ways of studying them can be developed

The reverse difficulty is involved when the problem is conceived too narrowly, or is hemmed in with questionable assumptions regarding solutions. What to do about disciplining tardy students illustrates such a problem A statement of the concerns already seems to asume a solution—namely that punitive discipline is the method. Yet, tardiness itself is a phenomenon that may have many different causes: discrepancy between school expectations and the culture of the students, a curriculum that fails to meet student needs, poor teaching methods, use of authoritarian or punitive controls, and so on When the problem statement already assumes a solution or involves a narrower view of the nature of the phenomenon than is appropriate, it is often difficult for teachers to face the task of analysing and discovering multiple approaches to the problem.

Unless these difficulties are solved in the course of problem analysis, the solutions are apt to be unprofitable, or else the teachers will begin to rationalise as to why the job should not be done at all. Thus, the groups that started with a monolithic view of slow learners began to feel that too much time was spent on slow learners anyway, often to the neglect of the average or fast learners Some wanted miracle techniques that would help slow learners without requiring much time. Others felt that slow learners should be in remedial classes. In such cases, problem identification and analysis need to include experiences to enlarge the perspective on the problem as well as change the teachers' perspective.

Often teachers describe merely difficulties rather than actual problems and the causes of these difficulties It is not unusual for the problem statements to name only an area of concern and not the difficulty inherent in that area, much less the factors that cause the problem. "My children cannot manage the text." "I don't seem to be able to manage the group" "My children are tardy" "My parents do not come to parents meetings."

The process of problem analysis is further complicated because of a tradition of reasoning from feeling on many curriculum problems. Frequently, teachers, supervisors and even curriculum directors and coordinators attach strong feeling to certain methods, materials or teaching devices. One method seems better than another one such as organising history chronologically, instead of, by topics or around focusing ideas. No problem illustrates this difficulty better than that of homogeneous or heterogeneous grouping in reading. Persons who strongly advocate homogeneous also usually tend to assume that there is some one royal road to learning to read, be it phonics or some other way. Having accepted this assumption regarding the learning of reading, homogeneous grouping seems to them an entirely reasonable solution However, when one assumes that reading is a multiple process in which students' current meanings and feelings figure, in which emotional control what can be learned, and which itself has emotional consequences on individuals, then the roles of experience, of group motivation, of mutuality in extending meanings, and hence of need for heterogeneity of experiences and skill stand out as distinct possibilities. These possibilities, however, are quite uncongenial to persons who have "adopted" a single method of teaching reading.

One teacher had a strong feeling about teaching reading readiness by emphasising precision observations and expression through painting. An examination of the paintings revealed that the boys and girls were unusually perceptive and could reproduce almost anything they saw no matter how complex the subject. Classroom observations indicated, however, that they could not talk about or restate a sequence of events A large portion of one year in consultant conferences was devoted to devising experiments and studies to convince the teacher that this latter need of the children was the more pressing, and that she could undertake to develop classroom experiences involving discussion and talk without a threat to her skill or integrity

This emotional attachment to a set method or solution of curriculum is not unique to teachers. Generally the traditions of rigorous scientific thinking about curriculum is as yet not too well established Curriculum "trends" are espoused on the basis of their concurrence with a set of beliefs and feelings rather than because of verifiable consequences on learning or contributions to educational objectives. Distinctions are lacking as to what is essential and universal and what is not Steps by which to proceed in formulating curriculum are not too well developed There is a tendency to idolise certain gadgets as self-sufficient, independent of the context in which they need to be used to be productive. It is small wonder, then, that practitioners find it difficult to use scientific method in probing curriculum problems, and especially to explore possibilities which are contradictory to already adopted assumptions and beliefs

Changing these assumptions and beliefs is naturally threatening to teachers' security, especially because of the general educational tradition which puts the teacher in the role of "knowing," of "having the answers," rather than in the role of being an explorer and a student If the immediate school climate is authoritarian, the threat implicit in initiating a questioning attitude towards teaching problems can be serious.

Under these conditions, problem analysis is a difficult and a slow process. It faces a double agenda: it needs to shape the problem into a more significant focus, and at the same time to serve as the means for changing feeling and beliefs. The entire process needs to provide not only for experiences leading to the clarification of the problem, but also for the diagnosis of stresses and strains, so that the subsequent steps in action research can be guided both by the nature of the problem and by the needs of the teacher.

Perhaps the most frequent difficulty is the pressure for solving a problem in the simplest and speediest possible way. Teachers often expect pat answers from an expert, such as a simple solution for handling a child from such capsule definitions as that the child is unresponsive, uncooperative, inattentive, fights and throws tantrums. This pressure for an immediate answer is caused partly by the urgency of the practical sitution. But it also reflects a naivete of thinking about educational problems and a traditional concept of the supervisor as an expert on answers. This expectation of recipe solutions creates blocks for facing the complexity of even the simplest human phenomenon. It makes especially difficult the facing of the possibility that such phenomena are often produced by the group climate in the school or by the teacher's own handling of discipline problems, (such as sending out of the class a disturbing individual, who quite possibly is disturbed because he cannot keep step with the class, thus reducing his opportunity to learn to do so) Such teachers need to face the prospect that there are no such final answers, and that, furthermore, they themselves are about the only ones who can eventually develop adequate solutions after proper study.

Problem anslysis then needs to accomplish several tasks. It needs to lay a scientific basis for understanding the fundamental character of the problem; to change teacher perspective, often against a resistance to doing it; sometimes it needs to change a lifetime habit on such matters as how to get answers or what to take into account in getting them; and it needs to initiate teachers into research procudures and to help them acquire scientific attitudes toward their own predilections. In other words, problem identification and analysis need to pursue several agenda at the same time. It would therefore be fatal to proceed with an assumption that action research is something that can be done smoothly, and by concentrating on research and action techniques alone.

This process takes time and care. If one wants to avoid doing research on insignificant problems or the possibility of devising extemporaneous solutions to situations which require thoughtful action, one cannot cut short this step. On the success of problem analysis depends the success of the entire action research process; the fruitfulness of action studies pursued; the number of persons who can be interested in action research; the motivation to continue, even though the solutions seem harder to come by than was orginally anticipated; and the extent of cooperative pooling of findings and data that is eventually possible.

Yet there are many pressures to cut short this step in action research. Because it seems like so much waste of time, especially when complications with teachers' feelings and needs emerge. It is at such moments that teachers, supervisors and research consultants alike are prone to decide that it is impossible to kindle sufficient interest, that cooperation is not forthcoming, or that the problems are too complicated to be dealt with at all Yet, thoughtful planning of problem identification and analysis involves answering questions as these:

1. What conditions should prevail to allow and to invite teachers to state problems of importance to them?
2. In what context and under what climate do problem identification and analysis help teachers identify with problems, allow for varied levels of involvement, and permit significant problems to emerge?
3 What sequence of steps is most effective in opening up a problem for research with teachers.
4. How can the level of analysis or of investigation be set up so as not to overtax the ability and insight of the workers, but rather to maintain their security and self-respect, while yet challenging questionable assumptions and cherished but mistaken concepts?
5. What is the timing factor? How is one to gauge how slowly or how fast to proceed? At what point should one introduce which considerations?
6 What is the optimum team pattern in guiding action research that will yield the greatest possible combined competence the role of the research consultant ? of the supervisor ? of teachers ?

Step 3: Formulating Hypotheses

Several preliminary investigations are suggested by the tentative hypotheses as to possible causes of the difficulties that were mentioned. These studies may serve as a source for more scientific guesses as to what is at the root of the matter They also enable the teachers to participate more actively in focusing the hypotheses than they could during the first steps in identification and analysis. These preliminary studies usually help teachers to see more clearly what factors play on the problem and what may be the causes of the difficulty. These investigations also sometimes eliminate questionable assumptions and open up a possibility of changing the perception of the problem. What appeared to be a difficulty with seatwork may turn out to be a problem of teaching method. What appeared to be lack of interest in reading, may turn out to be a faulty technique in teaching reading. While the problem analysis is directed at checking many possibilities, its outcome should be to narrow down these possibilities to the most likely ones, to be studied more thoroughly

Narrowing and focusing of the problem are important not only for economy of effort, but also for helping to arrive at more fruitful lines of study and hence more promising action steps. These hypotheses direct the further study They provide the basis on which to decide which type of data to secure and what to emphasise in interpreting them They will help avoid aimless shopping expeditions in gathering all kinds of data that may have little bearing on the problem. For example, in the study of slow readers described in the following section, serious work began only after the preliminary data showed that neither mental ability nor emotional disturbance was a serious factor. Elimination of these two possibilities left two other hypotheses, namely that these children had formed faulty habits for getting meaning from reading, and that their "experience readiness" for perceiving context needed to be strengthened. These focusing hypotheses helped decide which data about the children and their backgrounds were relevant and which were not, which techniques and study devices were appropriate and which were not. This narrowing of the field makes it possible to spend available energy and time in securing precise and adequate data, and in making thoughtful interpretation of these data.

For example, the group concerned with slow learners needed specific descriptive case studies of several slow learners before they could factor out the most common causes for slowness, and could see that these causes formed a unique syndrome for each individual. After that it was possible to check more carefully on physical deficiencies, to study data on ability, reading, consistencies in responses to a variety of school experiences, and to identify systematically each student's specific difficulty.

In narrowing and focusing the problem a discriminating use of appropriate research techniques becomes important It is necessary to develop, invent, borrow and adapt a variety of research techniques. Some of these techniques can be used in their entirety, as is the case with sociometric tests. At other times techniques borrowed form other disciplines will need to be adapted or simplified.

For example, to enable teachers to gauge the socio-economic status of the students in a high school, in order to re-plan the activities programme to meet the needs and interests of the students, the scale for socio-economic class status was adapted and simplified. Of several criteria used, occupations were chosen as the most helpful one from the standpoint of prediction. Each teacher in the study group complied a list of occupations of the fathers of the children in his/her own classroom. This information was translated into socio-economic class grouping at three levels, orginally employed. This rougher classification was used because the data were more limited, and because conclusions could be drawn from them through use of a three-way classifications These data were then used to analyse the patterns of social learning, especially in interests, in the so-called behaviour problems, in motivation and participation.

These more serious investigations should result in some action hypotheses For example, there should be a rather definite idea of the kind of programme to pursue in solving the problem how to help slow readers if their difficulty lies in meagreness of experiences or in poor habits of using context clues, how to prevent tardiness, if tardiness is caused by absence of routines for time-telling, how to approach contacts with parents who are scared of the school, and so on

Step 4: Experimentation and Action

After studies have generated hypotheses regarding the most promising action, it is possible to set up experiments· a re-shaping of curriculum content, a method of teaching, a plan for grouping, a new emphasis in classroom procedures. If these experiments are set up in line with the hypotheses, it is easier to see what their particular emphasis should be: whether reading should emphasise word drill or context clues; whether a permisive treatment or help with routinising some experiences is the most promising treatment of disturbed children; whether seatwork should have greater relationship to ongoing lessons or merely be directed more concretely, etc

In designing an experiment it is necessary to plan its steps carefully so that all important elements are controlled. A part of this step also is to help teachers acquire new skills they may need for making this a successful experience. For example, they may need to know to conduct discussions in a new manner, how to organise necessary learning experiences, or how to plan these experiences so that they will follow the psychological sequence of the learning process.

In setting up a design for experimentation, human relation factors also need to be considered. There are psychological hazards in experimentation. For example, experimentaion, whether with new ideas or new ways of teaching, always involves a risk—a risk of doing something new without assurance of succeeding, a risk of proceeding without sufficient skill, a risk of discovering that what one has done is not the best possible way, a risk of making mistakes. In most practical situations making mistakes can be personally threatening or professionally dangerous This uncertainty can create a resistance on the part of teachers especially when they do not understand the nature of the threat Sometimes one hears teachers say they simply are not interested in studying their problems. Actually the teachers may be insecure about the new skills that experimentation requires.

Experimentation, therefore, needs to be carefully guided. Teachers need to be freed of their fears of making mistakes. They need assurance that mistakes are pardonable, and can be corrected as one proceeds and learns They need to feel free to admit what they do not know, to secure help, to ask questions. While inventiveness and creativity are important for the teacher, the innovations need to be scrutinised for their impact on learning before they are put into action. Teachers need help in planning a step-by-step procedure, and setting up ways of checking their procedure. They need help in practising the new skills that may be needed. Above all they should develop a healthy attitude towards experimentation and towards avoiding overexpectation regarding immediate success They need to learn to differentiate between changes in students that come about quite rapidly and those that will take time and repetition.

Step 5: Evaluation

Evaluation is often a weak point in action experimentation. New methods, new treatment of content are tried without knowing too clearly what the actual results are. There is confusion between objective and subjective appraisal. Appraisal is often too limited in scope and does not cover the chief objectives for which the action or experiment was undertaken. Usually the socalled intangible outcomes are easiest to omit, becuase there are no easy techniques for describing these outcomes or for getting quantitative measures of changes in such areas. Others discard objective precision appraisal altogether and may rest their case exclusively on describing such outcomes as growth in happiness, interest or climate. Too often proper benchmarks are not established at the start, so that the description of end results fail to give an adequate assessment of growth.

One important part of evaluation is to keep records of both the changes in students' responses and the procedures and materials used. In experiments of this kind the procedure, method or content is under scrutiny, but the success of the experiment can only be assessed in terms of its effectiveness in producing desired effects in students. Hence the relationship of the procedure to changes in students must be seen clearly. Inadequate description of the procedure used makes it impossible to see what was responsible for change. Inadequate assessment of change cultivates the often deplored gimmick attitude: an attachment to a method or to a procedure for its own sake, and without a clear idea of its effect on student learning.

While one need not overlook the teacher's subjective judgement about what changes occur. She/he should also secure objective evidence, such as records of performance, test data, any other tangible data, which can be subjected to careful comparative analysis. In experimenting it is also important that these records and assessment be available for the beginning of the study, as well as for the end point, Often a continuous record is necessary

AN EXAMPLE OF ACTION RESEARCH AND EXPERIMENTATION

The example which follows illustrates the continuity of the steps in action research. In order to avoid complicated descriptions, the illustration contains simple problem with a tangible focus.

Findings Ways of Helping Slow Learners

Step 1. Problem Identification

Three teachers were concerned with slow learners. They complained that thier classes contained many children who were incapable of "learning." The slowness of these children in learning to read retarded them in all school work. The descriptions of the teachers suggested that they viewed all slow learners as being alike and that slowness is a kind of monolithic quality shared by all these students in a like manner. Therefore, these teachers also treated all slow learners identically—usually intensifying drill, giving individual help, and some times emphasising punishments and rewards more strongly. The teachers did not even consider the possibility that the slowness of these children to learn might have been influenced by various factors in the children's own experience. Further, the teachers seemed to hold to these ideas with unusually strong feeling.

Thus the task for problem identification was two-fold. to discover the actual causes of slowness and find appropriate remedies, and to help change in teachers this monolithic concept of slowness in a manner which would also help them revise their feeling about the naturalness and inevitability of slowness

Step 2· Problem Analysis

The first attack which these teachers made in analysis or approach was to attempt a general definition of "the slow learner." This attempt led to many exceptions in both their own definitions and those they found in books, and turned out to be a dead-end trail. However, it shook somewhat the beliefs that all slow learners are alike.

Next, these teachers tried to assemble some of the common characteristics of slow learners. They asked other teachers to supply those characteristics which they thought were common to their slow learners and aksed what they did about these This attempt yielded a long list of characteristics with a wide diversity of opinion about the importance of each. Among these were characteristics like "lack of self-confidence," "low vitality," "short memory," "poor parent-child relationships,"—all characteristics which described general conditions rather than precise causes of slowness in learning.

This procedure also had several shortcomings By focusing upon common characteristics, a long list resulted which represented largely judgements of teachers or of parents, and were too general to give many action clues. The remedial procedures applied were therefore general gimmicks rather than related to causes of difficulties of particular individuals. During the second workshop, at a point when action research techniques were introduced by the consultant, these teachers started studying individual slow learners in their classes in order to determine more precisely the causes of their difficulties Sixteen teachers had joined the project now Some worked in small groups to discuss diagnostic techniques, to share their discoveries and experiments, and to report on progress Others worked individually.

The first step was to select the individuals to be studied The group members canvassed the particular deficiencies they had noted, and tried to discover the typical and recurring ones: Arun's interest span was extremely short. Only rarely could he keep his place in reading When called upon to read, he started as if in a dream, looked around guiltily to see what page the others had. Actually, he knew quite a few words but read with no understanding. He had difficulty in remembering the words. He could not remember the names of the children in the stories. He could not follow directions or work by himself in his workbook. His many absences occurred at this time.

Ram, a third grader, was first put into the lowest reading group with a first reader. The teacher noted extreme nervousness: his . oice was tight and his hands trembled, although he read well and knew all the words His spelling was terrible. He missed all but one or two words each week.

Mohit, a second grade boy, had the greatest difficulty in reading although his reading readiness test showed a high prediction of success. He did not seem to recognise words that he had seen dozens of times before. He had no concept of number and could not even write to 200 by rote. He added numbers fairly well, but could not subtract nor could he spell.

Roza, in grade one, appeared very immature, was inattentive and not interested in activities during the reading readiness period. Instead of doing her seatwork she scribbled over other children's work or tore their papers. After six weeks of reading readiness, she scored the lowest in the group.

Dev, a second grader, was much below average. He was only able to read a high first primer and was unable to follow directions or work in his workbook alone He never finished his work. He would make marks on a paper, put it away, start another, and finally give up. He would then begin to wander around the room to get a book, or puzzle, or clay. He would continually watch the boy behind him or go to him. He seemed to want to read aloud, although he got very nervous when called upon to read He would shake his leg and lose his place. He was unable to spell more than a word a week, and seldom that. His writing was confused and illegible. His art work was messy and he did not seem to enjoy it. He wrote many letters backwards and had trouble printing letters. He always made his 7's and 9's backwards although he was able to do simple arithmetic combinations, using a counter as a crutch. He would not do his problems in sequence, but skipped around and then quit completely.

All the cases showed retardation in academic achievement most frequently in reading, but also in spelling and writing. Most also were discipline problems of some sort. The study of available records brought out the fact that most of these children had average or only slightly below average IQ's One child had an IQ of 54. Two tested between 70 and 80, others between 80 and 108.

These preliminary explorations suggested that low mentality was not the sole cause of slowness and not even the primary one. It seemed that multiple causes were at work, and that each individual may have been retarded for a unique combinations of these causes. While the general difficulties were repeated in many individual cases, they tended to combine in a unique cluster or a syndrome in each individual case. If this was verified by a systematic study, it would mean that a different procedure was needed to help each child.

Step 3. Gathering Data on Focused Hypotheses

It was clear at this point that a more orderly and systmatic study was called for. In order to introduce a designed selectiveness in the studies of individuals, which otherwise might be unnecessarily broad and burdensome, the group tried to hypothesise on the general causes of slowness in learning. The group used both their own preliminary explorations and the available research as sources. This procedure yielded a list of possibilities which were considered crucial enough to serve as a guide for observations and interviews. Following is the list:

1. Physical handicaps, such as those related to vision, hearing, nervousness, frequency of colds, absences for illness

2. Feelings: fears, hostilities, inferiority and guilt, jealousies, self-expectations.

3. Emotional climate at home: broken home, parent cooperation with the responsiveness to children, attitude of parents, nature of controls used, stability in home life and relationships.

4. Relaionships with other children: the degree of isolation at home and in school, acceptance and rejection, the adequacy of social relations, social skills, the nature and frequency of contacts with peers

5. Environmental and cultural factors: the nature of experiences affecting maturity and learning, newness to the area, values of the home, and patterns of spending time and rearing children.

6. Behaviour in classroom: outbursts of temper, inattentiveness, restlessness, unusual amount of attention seeking.

7. Consistencies and inconsistencies in manifestations of slowness· whether slowness showed in all situations, the particular situations that provoked slowness, contrasts between the behaviour in the classroom and on the playground and in different activities in the classroom.

Steps 4 and 5: Experimentation and Action; Evaluation

To describe slow learners as precisely as possible, these teachers used several diagnostic techniques. Besides reporting anecdotally their observations in classroom and on the play-ground, teachers studied cumulative folders for data on reading readiness and intelligence, and for previous school history and health information Occasionally a special achievement or mental maturity test was administered. In two instances, where severe mental retardation was suspected, a psychologist gave a special test. The doctor provided further mental or physical health data for two cases. A counsellor and a welfare worker were contacted. Six teachers asked pupils what they would wish for if given "Three Wishes." In two instances, the children were asked to write on what made them mad These last techniques were used with the entire class, in writing with older children and in informal conversations with the younger children. Sociograms were used in two classrooms to determine patterns of social relations. All teachers interviewed the parents by a schedule which gave insight into the cultural and emotional environemnt of the home and neighborhood

In order to be sure to discover the combinations of factors working in each case, and to identify the most important factors operating in each individual, a systematic study sequence was designed. This sequence also became the guide for reporting the studies and experiments.

1. Describe the pupils' behaviour. Use as many diagnostic techniques as possible to get accurate detail and to reveal possible causes.
2. Try to look for a pattern or clusters of characteristics that seems to have most bearing on pupils' behaviour.
3. Identify characteristics that appear to be crucial for each individual.
4. Develop a hypothesis (best guess) of the action you might take that is most likely to make a difference in pupils' behaviour
5. Plan the procedures you will follow.
6. Test your hypothesis in classroom experiment.
7. Report on what you did and what happened.

The information secured by this method was complied into case studies in order to facilitate discussion, interpretation, and the formulation of action hypotheses.

SOME AREAS FOR ACTION RESEARCH

The following areas are suggested with a full recognition of the fact that actual research tasks by any action group probably will be on specific problems within these areas:

1. Selection and Organisation of Curriculum Content

Increasingly the task of curriculum organisation is falling on the shoulders of DIETs and of individual teachers. While there are statewide outlines, and while many teachers still "follow the textbook," there is an increasing demand for local formulation of curriculum. The ability range of students has become too wide to use the same methods and materials with all students As the school population approaches the 100 per cent "of all the children of all the people," the variation in their social learning and motivation has reached a point at which it is increasingly difficult to provide equal opportunities for learning by offering a uniform diet of content to everyone. Increasingly, therefore, it is necessary to determine what the essential universal learnings are to be, and then how to vary the particular content with which to achieve these universal essential learnings.

Studies of social class structure and of its implications for learning have pointed out that there are far greater variations in roads to learning than there are in sheer intellectual capacity to learn. It behoves the educators, therefore, to search for more varied means of stimulating learning than are now available. A lot has been learned also about developmental sequences in learning which raises questions about the current practice of uniform content sequence from grade to grade for all students The importance of the varied psychological life needs as guides to the selection of curriculum content has been pointed out sharply These pose many problems for practical studies It is necessary to probe into what the patterns of needs are in various age levels, in several different culture groups, including the socio-economic class levels. Experiments are needed on how to reconcile the essentials with the particular variations in needs and interests. All these questions bear on the decision of what to teach and now to go about it. All these are also essentially practical problems, which, no matter what general research is available, require testing and experimentation in local practice This will mean that local schools need to conduct their own studies of student needs and of patterns of social learnings with which their students come to school.

2. Interpersonal Relations, Grouping and Leadership

Recent studies have revealed the bearing of interpersonal relations on learning and personality formation. They have demonstrated the impact of psychological climate on learning and the achievement of individuals They have pointed out that the nature of interpersonal relations, such as the extent of belonging and isolation, controls what an individual does in the classroom. Patterns of interpersonal relations seem to have a bearing on classroom discipline, and there seem to be possibilities for managing group factors to therapeutic ends for disturbed children. These findings have also demonstrated the need for examining the patterns of grouping, such as ability grouping, for their consequences on human relations. Many teachers are beginning to experiment with sociometric grouping for committees, and even for reading groups, using interpersonal relations as a basis for grouping in place of ability or achievement. The majority of these studies are outside the classroom situation, and much remains yet to be studied to apply these ideas to educational practice appropriately and effectively.

3. Meeting Heterogeneity

Classrooms are increasingly more heterogeneous socially, culturally, intellectually, and by social class and social learning. Many problems are created by methods of teaching which take for granted a uniform standard of achievement and a uniform method of learning skills as well as content. While the school population is growing in heterogeneity, teachers and lay citizens alike are raising questions about the number of slow learners and about the inadequacy of school programmes for challenging the faster and more creative learners. General research has much to say about the diverse cause of low achievement and the consequences of differences in ability, yet the general practice tends to solve this problem of heterogeneity by the simple device of segregating the slower and the gifted learners either in different classrooms or in different groups within the same classroom. This practice overlooks the consequences of segregation on the development of democratic value patterns, self-expectation, peer relations and on general orientation towards society It also sidesteps the crucial problem of developing curriculum patterns and teaching methods designed for heterogeneity. Practical studies and experiments are needed on how to handle heterogeneity in the classroom. Explorations are needed of the more open-ended methods of teaching that would permit heterogeneity to function to the benefit rather than to the detriment of any segment of the group.

4. New Light Needed on Forms of Control in the Classroom

In spite of the oft-repeated experiments demonstrating the role of social control and the different effects of different styles of control, practice persists in personal-punitive forms of control and in authoritarian methods of discipline which create more problems for the teacher than they solve. Teachers need to learn vastly more about their problems and methods of control especially control of the so-called problem students While a vast amount of literature is available on discipline, the method of non-disciplinary group control, and the psychologically appropriate treatment of difficult individuals are still in their infancy. Little is known about the development levels of group controls and about the cultural factors in styles of effective controls. There is also still the task of studying the particular ramifications of these levels and factors in the particular situations and at a more practical level of perception.